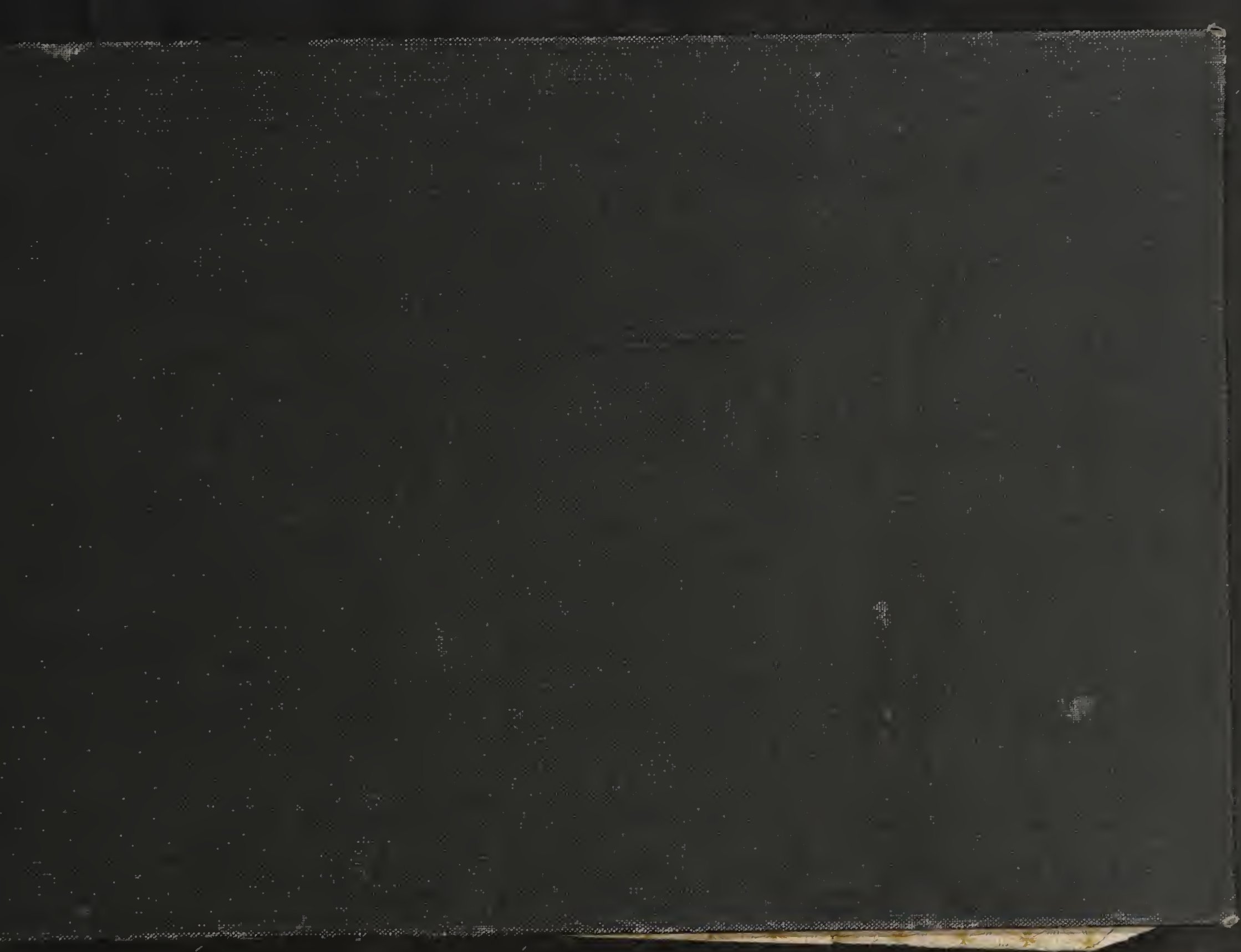
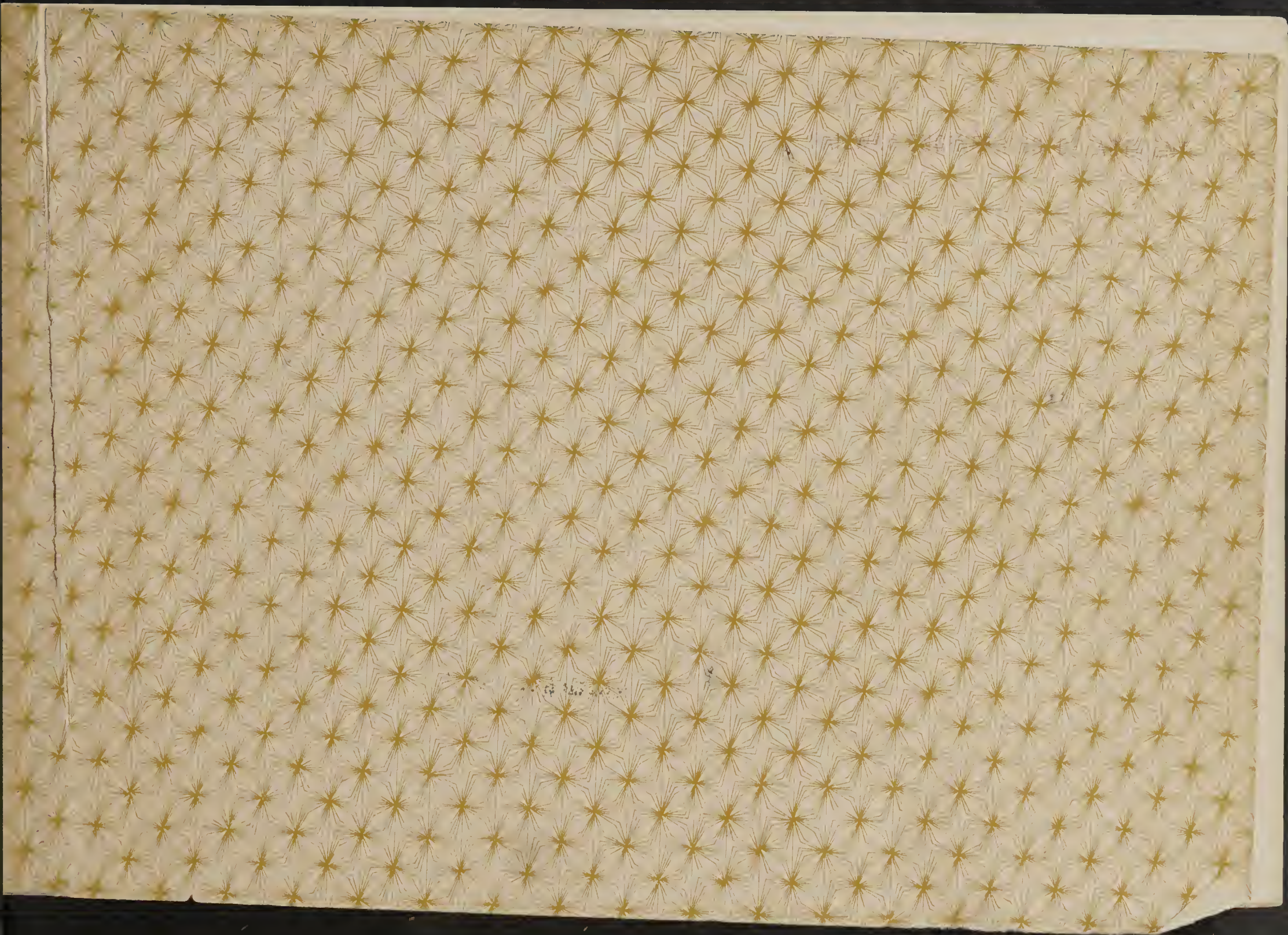


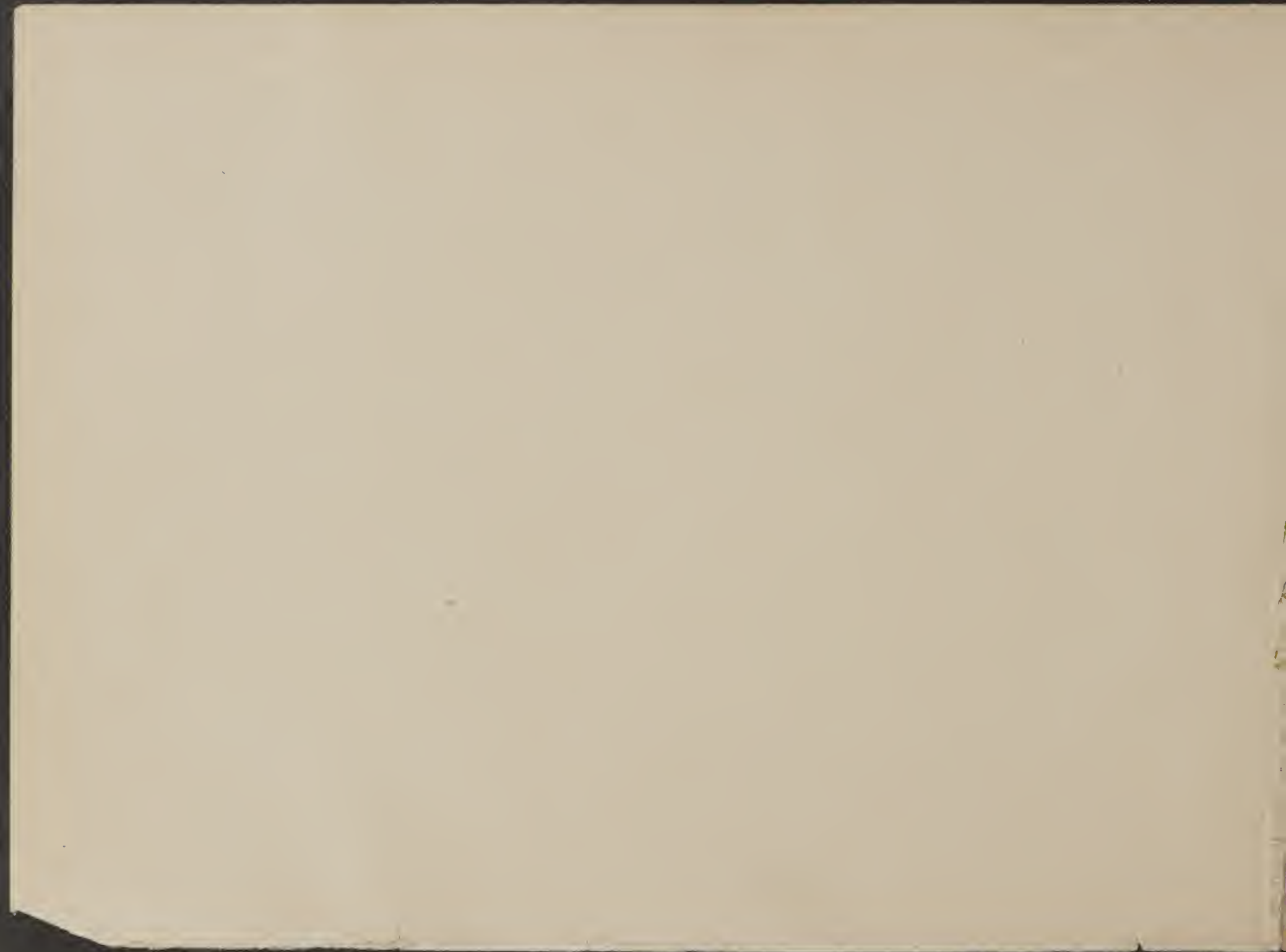


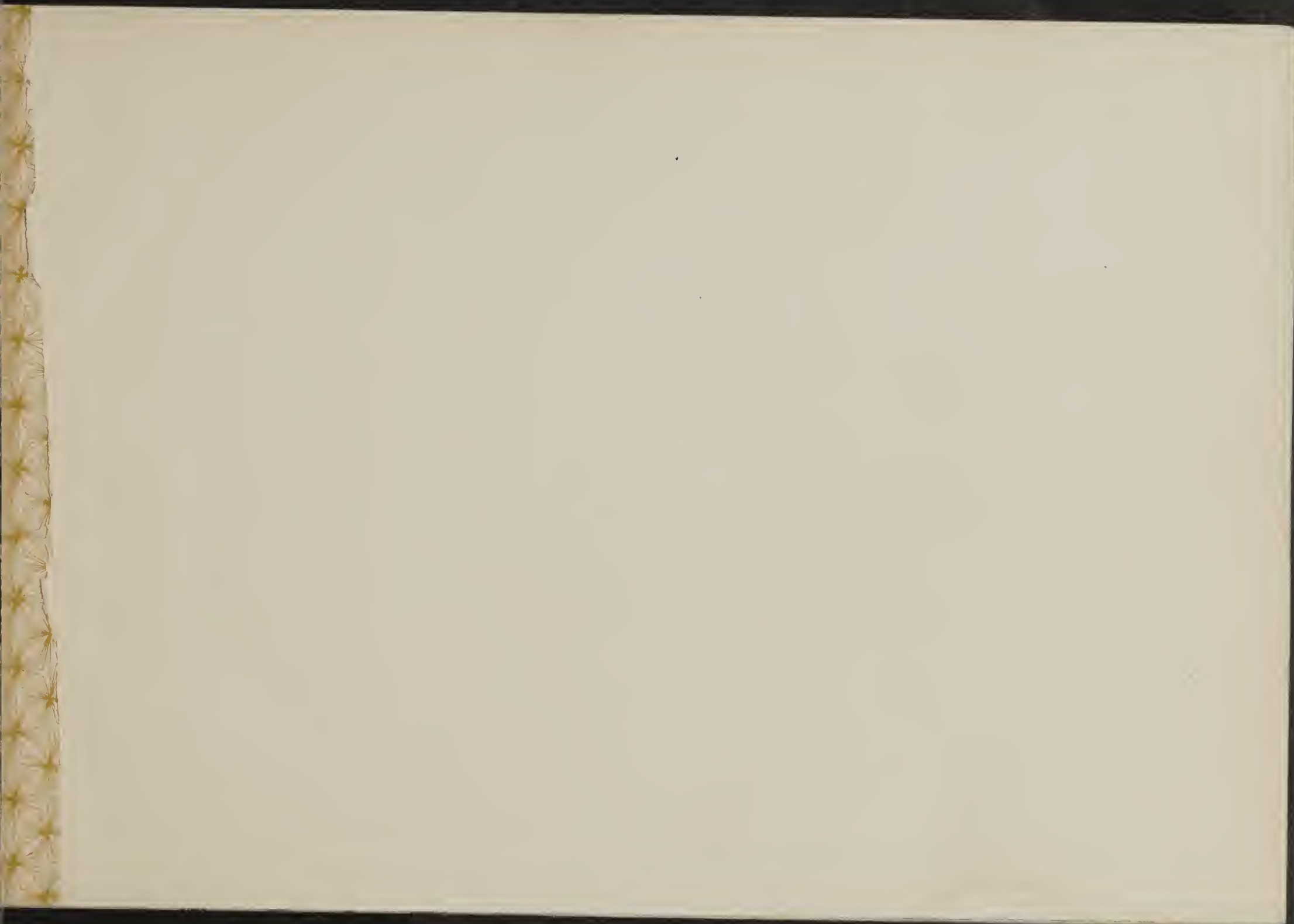


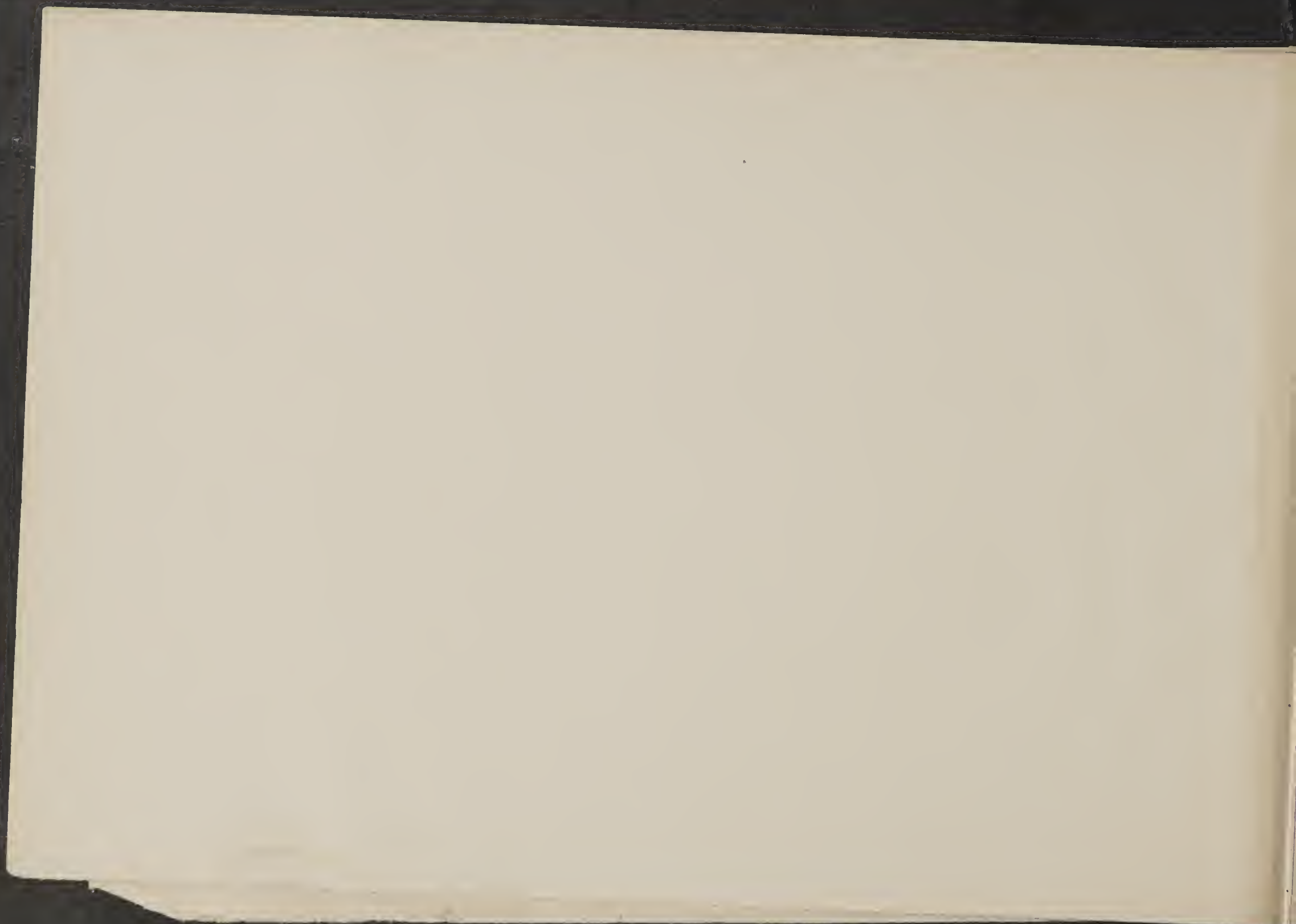
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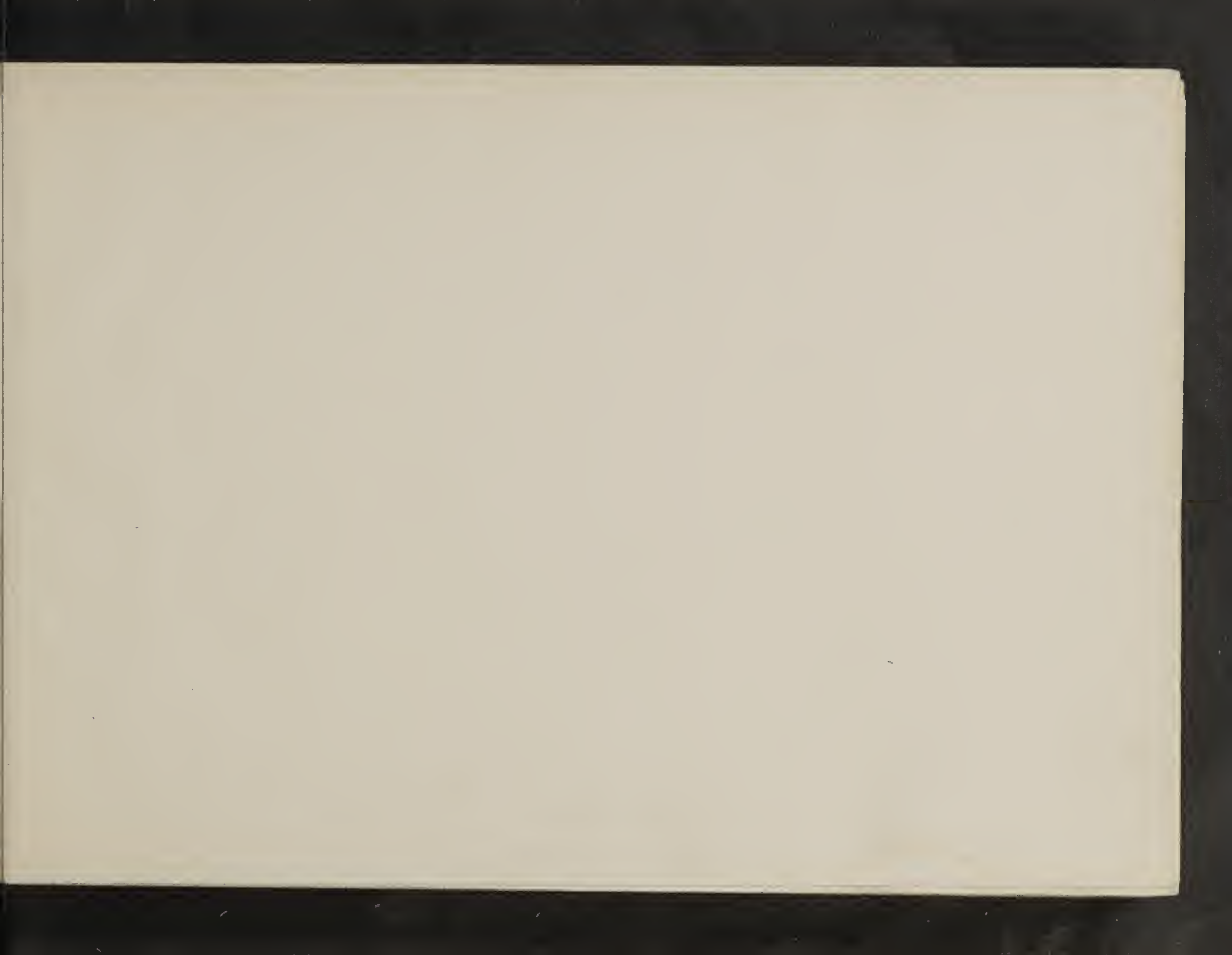
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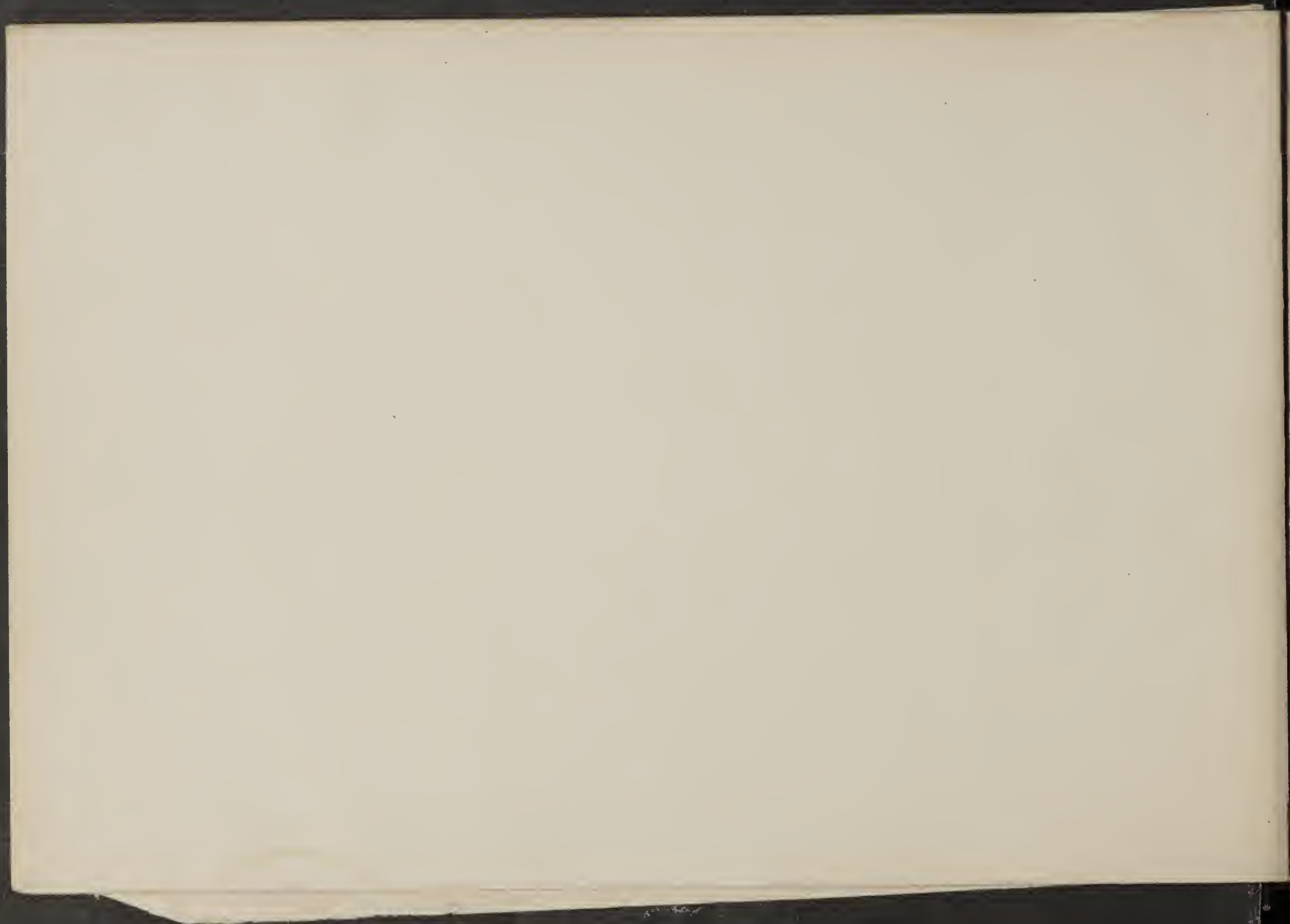












RAILWAY ENGINEERING DEPARTMENT

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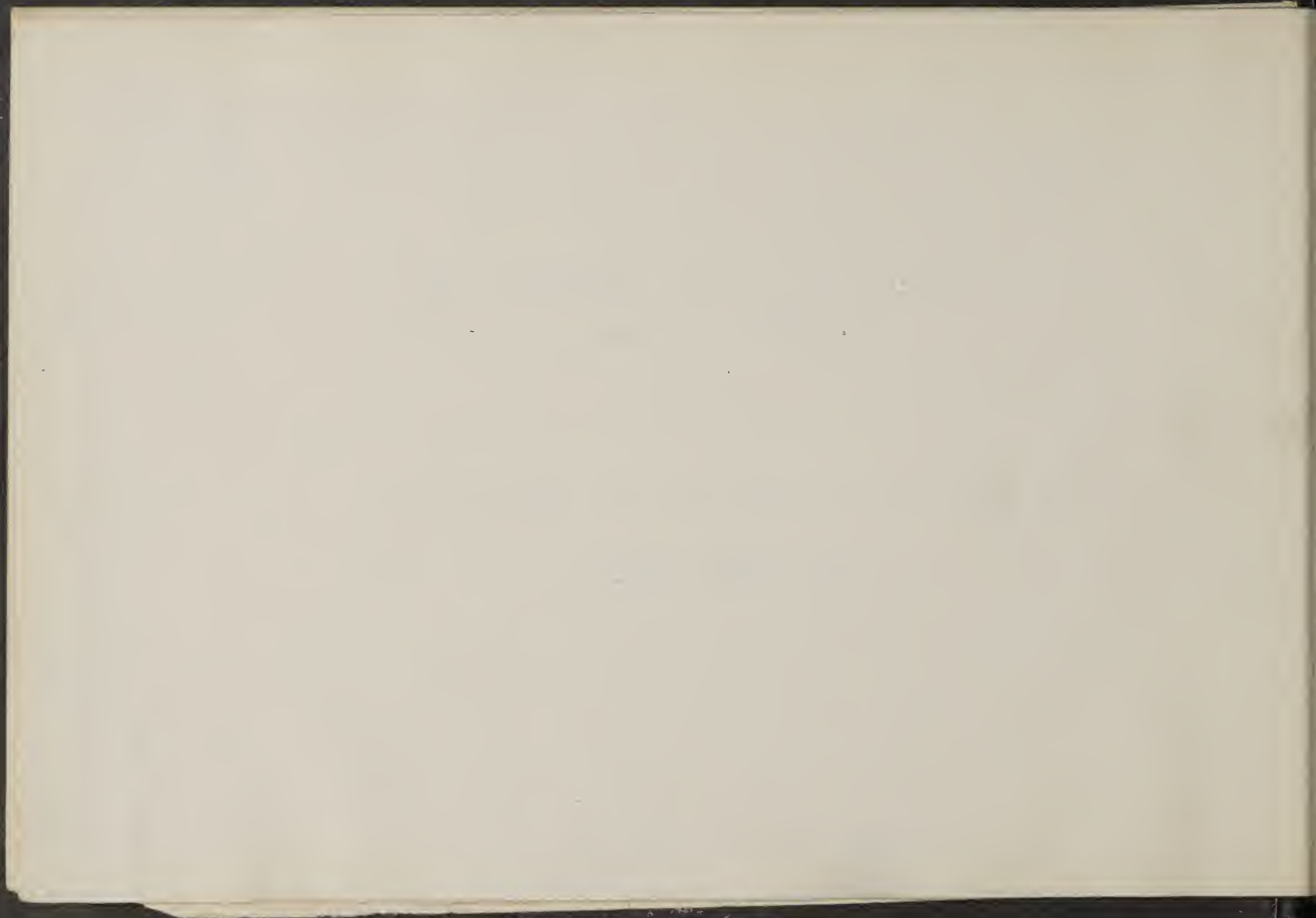
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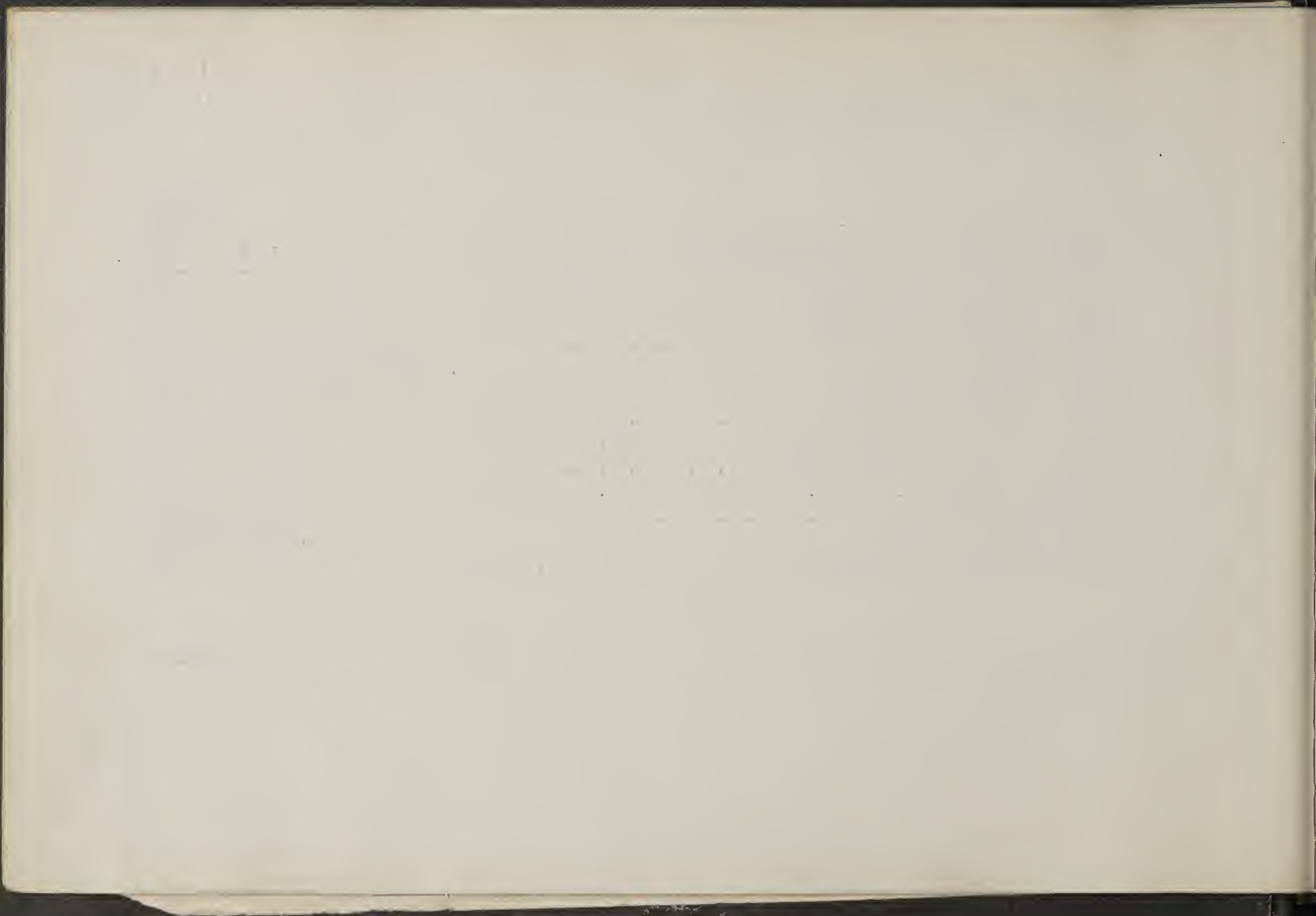
AMERICAN LOCOMOTIVE COMPANY

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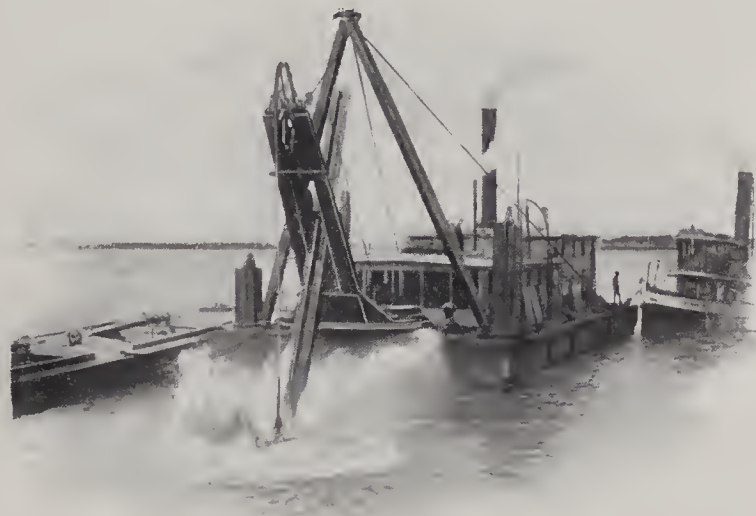
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ATLANTIC EQUIPMENT COMPANY

111 BROADWAY, NEW YORK
RAILWAY EXCHANGE, CHICAGO

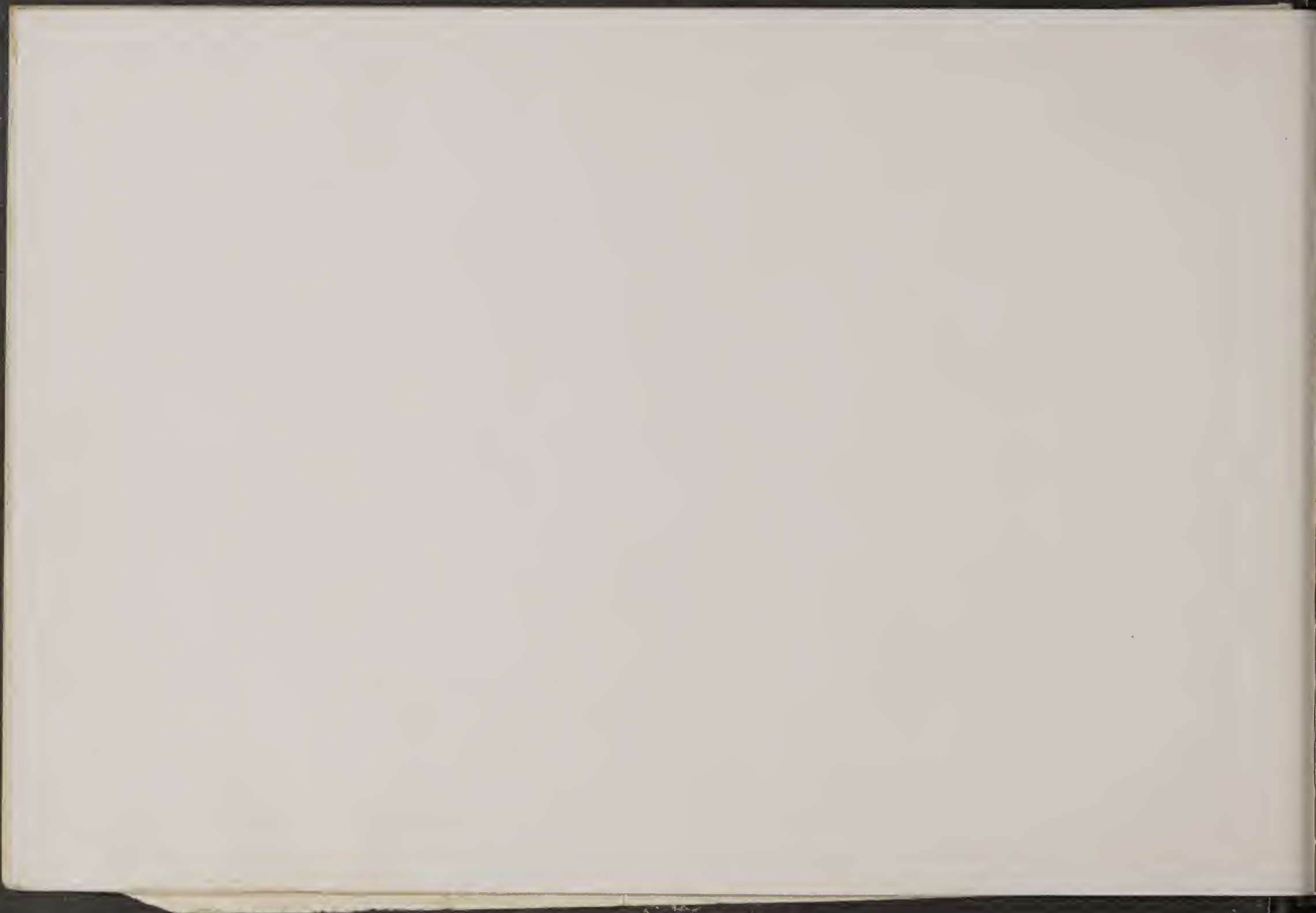
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DREDGES

BUILT BY AMERICAN LOCOMOTIVE COMPANY

[The Code Word for this Pamphlet is "CALEACTE"]



I N T R O D U C T O R Y

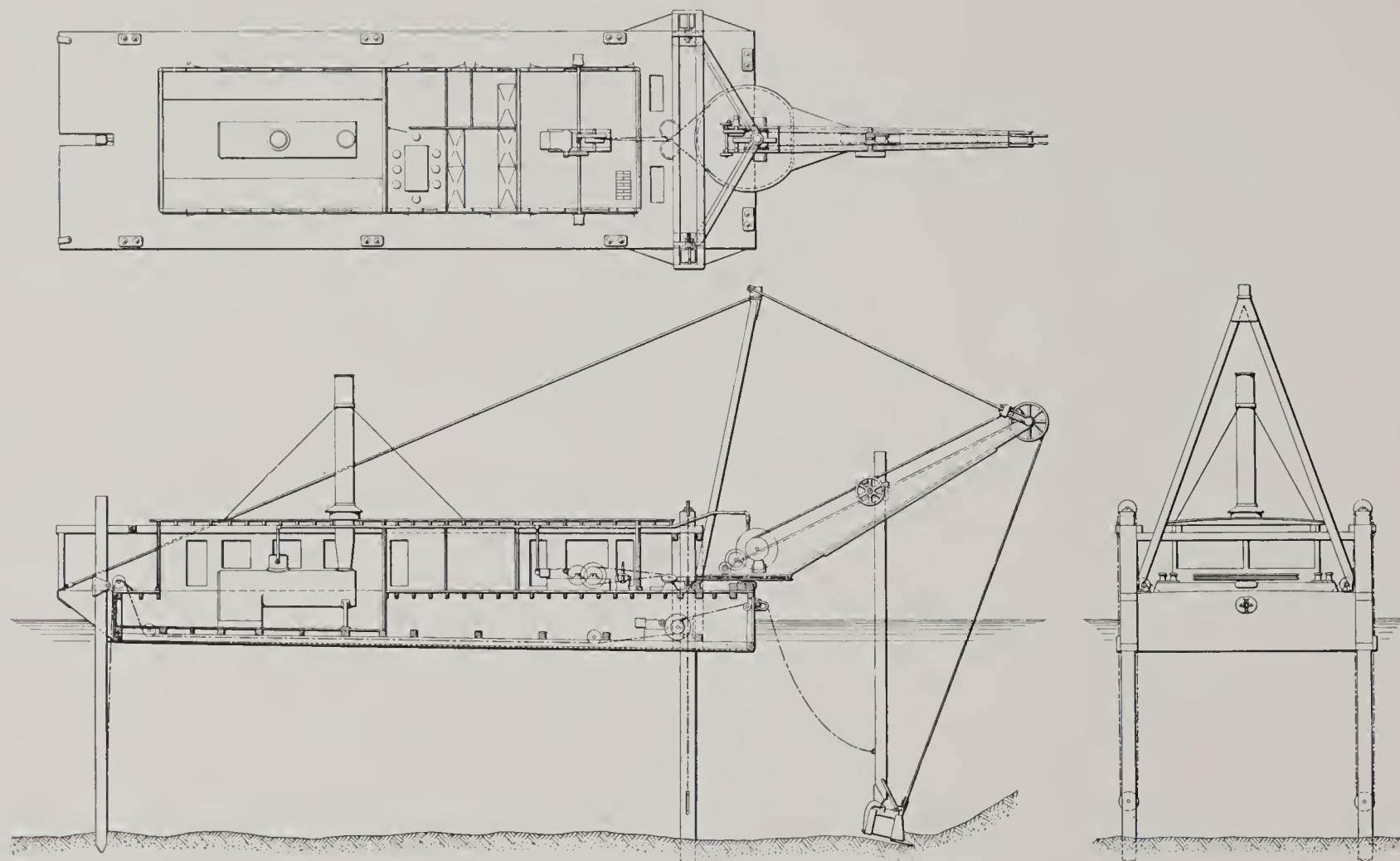
The Atlantic Equipment Company is prepared to build to order dredging machines of standard types up to the largest capacity for every service. In this catalogue are given a few illustrations, which may serve as suggestions as examples of machines already built and in successful service.

Modern conditions require that work shall be done rapidly and cheaply. This means that the tools employed shall be of the best designs, adapted to the work, based on long experience, and built of the best materials and workmanship and capable of maintaining a high average output with a low operating cost.

The Atlantic Equipment Company has already built and placed in successful service a number of powerful dredges. These include two dipper dredges for the Panama Canal, one 8-yard dipper dredge for the Cuban Government, a 30-inch hydraulic dredge for the Commissioners of Lincoln Park, Chicago; also several large elevator dredges.

The dredges are built from designs by A. W. Robinson, M. Am. Soc. C.E., whose work in this line has been well known for many years and includes upwards of 140 dredges, which are in use in various parts of the world.

ATLANTIC EQUIPMENT COMPANY



STANDARD TWO AND ONE-HALF YARD DIPPER DREDGE

THE DIPPER DREDGE

This type of dredge is built in all sizes up to a 12-yard dipper and a working depth of 40 feet. It is the representative machine of the American contractor, suitable for miscellaneous work. It can dig hard or soft material, make slips, docks or small canals, dig up foundations, lift heavy weights, pull piles, load scows or cast on the bank. It is not suitable for rough water, nor for large volumes of material covering great areas, nor can it deliver material to a greater distance than the radius of its boom.

On page 4 is illustrated our standard $2\frac{1}{2}$ -yard dipper dredge. This dredge is built on similar lines to our well-known "Atlantic" Steam Shovel and embodies a number of important improvements not heretofore used in dipper dredges.

These are:

1. The hoisting machinery is mounted on the boom with direct pull and single sheave.
2. The use of two parallel parts of hoisting rope halves the strain and increases the durability 5 to 10 times.

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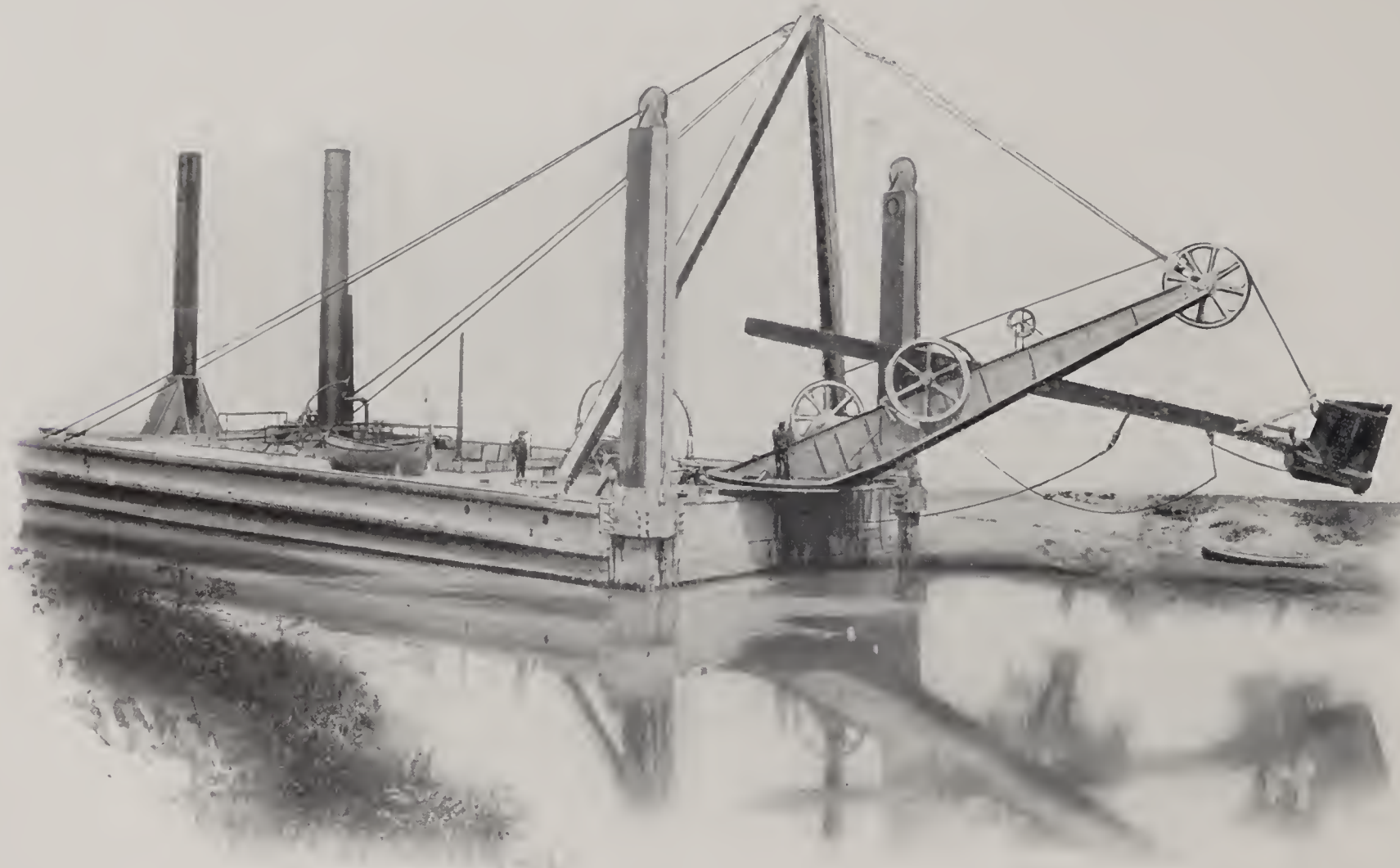


FIVE YARD DIPPER DREDGE—FOR SERVICE ON THE GREAT LAKES

3. The use of solid dipper arm instead of usual split form.
4. Simplicity and cheapness of erection; as almost all the machinery is self-contained and does not require to be built into the hull.
5. The impossibility of machinery thus constructed to become displaced or out of line owing to springing of the hull.
6. The direct control by the engineer of all the motions of the dredge, thus enabling it to be worked by a very small crew.
7. The great economy of fuel due to a large and efficient boiler and elimination of a large percentage of friction, which is a constant waste in other dredges.
8. The availability of a large space in the central part of the hull for crew's quarters, or other purposes.
9. The superior accessibility for examination and repairs of all the machinery.

This dredge is built in several sizes and to suit requirements of depth, character of material and radius of delivery.

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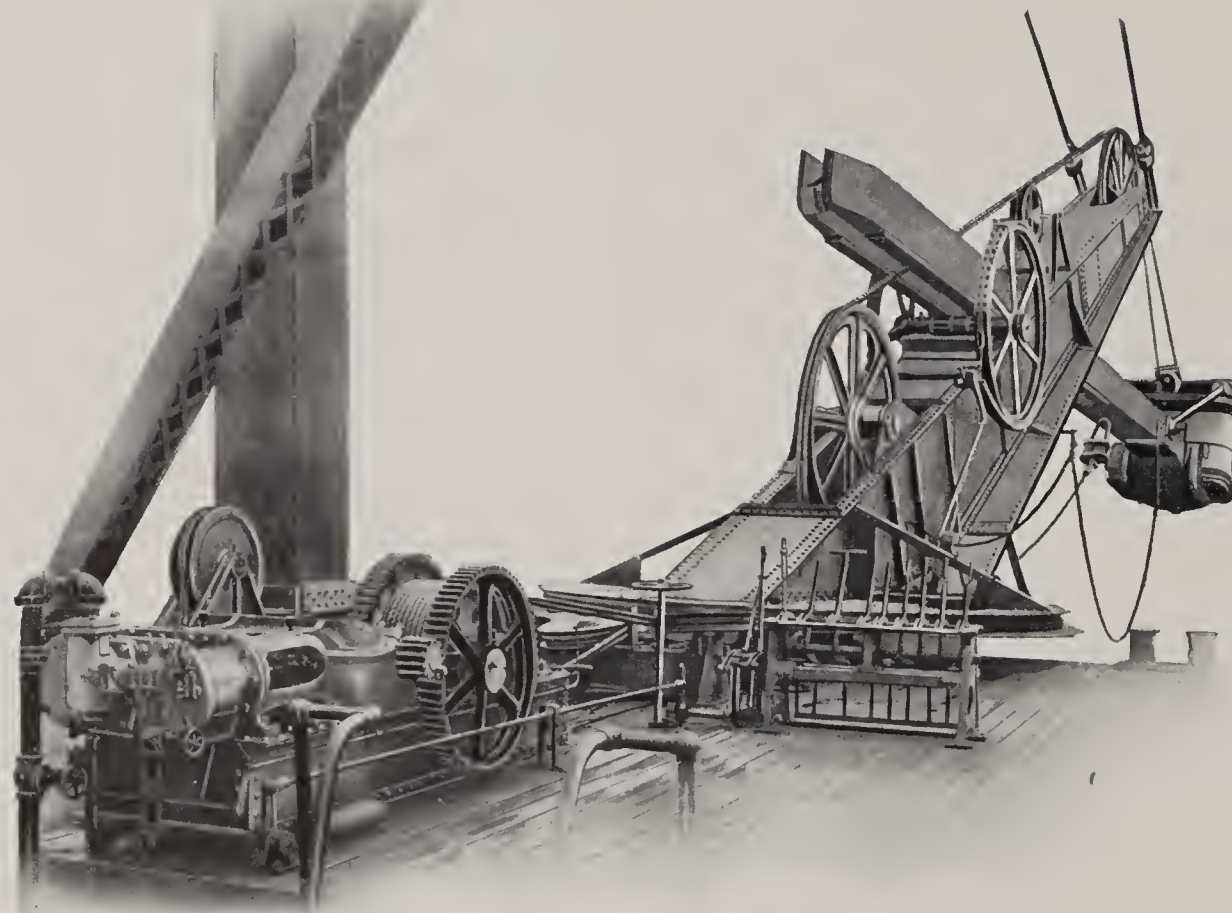
EIGHT YARD DIPPER DREDGE BUILT FOR THE CUBAN GOVERNMENT

The illustration on page 6 shows a 5-yard dipper dredge for service on the Great Lakes. It also carries a 3-yard dipper with teeth for hard digging. Note the strength and simplicity of design, the steel boom of straight tapering form, and steel turntable built solid with the boom. The hoisting is by direct wire-rope and all the movements are under direct control of the runner.

Two similar dredges have been built by the Atlantic Equipment Company for the Panama Canal and are now in service.

All of these dredges are built on lines of the greatest strength and simplicity, the object being to produce a machine of correct engineering design and of the best materials and workmanship that will withstand continuous hard work without breakdown.

The large dredge shown on the opposite page was built for the Cuban Government, for general harbor dredging. It has a steel hull 110 ft. x 42 ft. x 12 ft. The spuds are of steel 40 inches square. The steel boom is 44 feet long of very substantial construction for hard work in deep water. The main engines have double cylinders 17" x 20" and exert a direct pull upon the dipper of 180,000 pounds. There are two parallel hoisting ropes on the Robinson patent system by which much greater durability is obtained than with the ordinary single part rope.



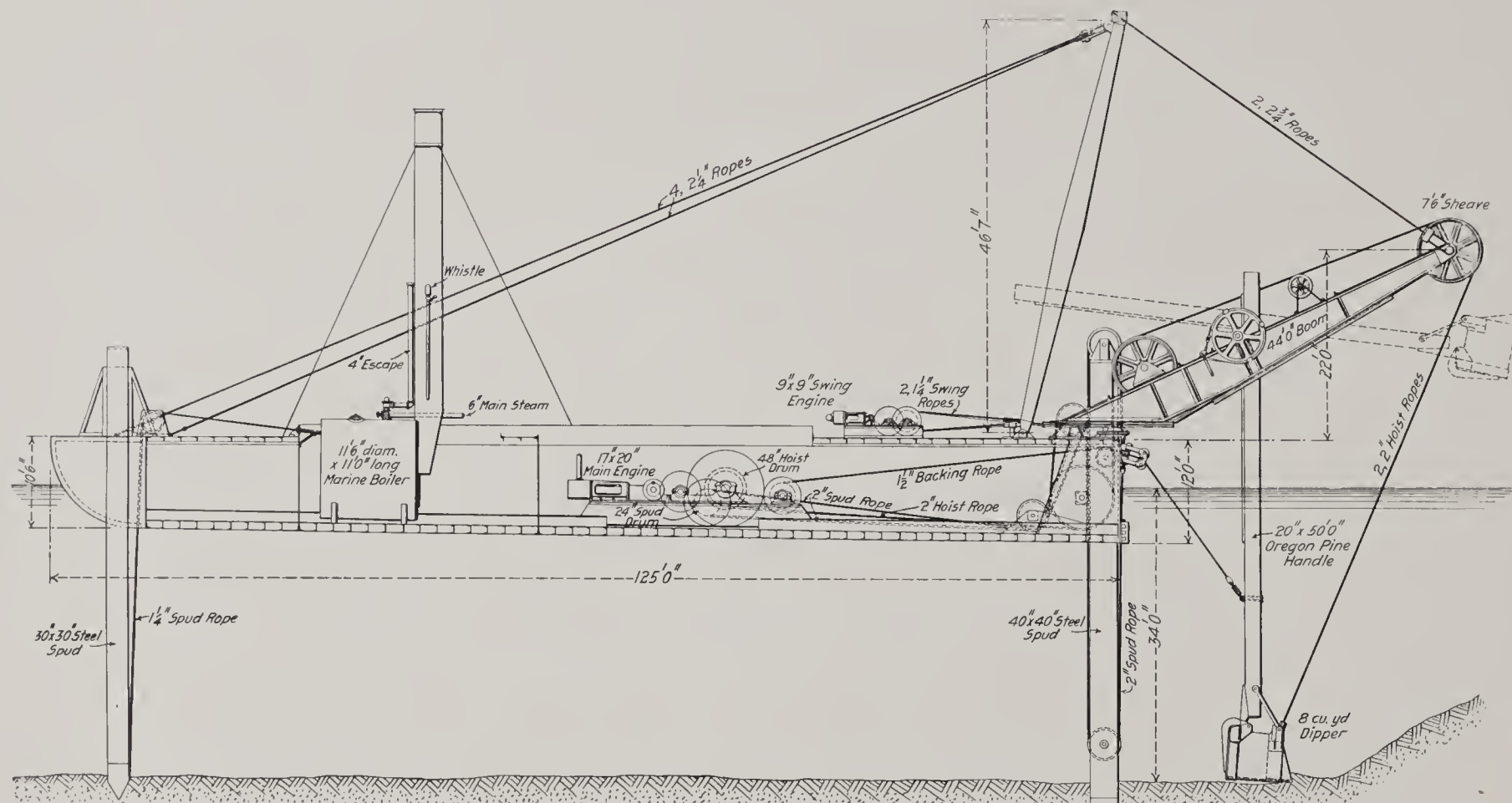
VIEW ON FORWARD DECK OF EIGHT YARD DIPPER DREDGE BUILT FOR THE CUBAN GOVERNMENT

This dredge was built and tested in actual work under steam without any deckhouse or superstructure as illustrated. The A-frame and all external parts were then removed and packed on board and made ready for sea. The dredge was then towed to its destination and erected with suitable deckhouses.

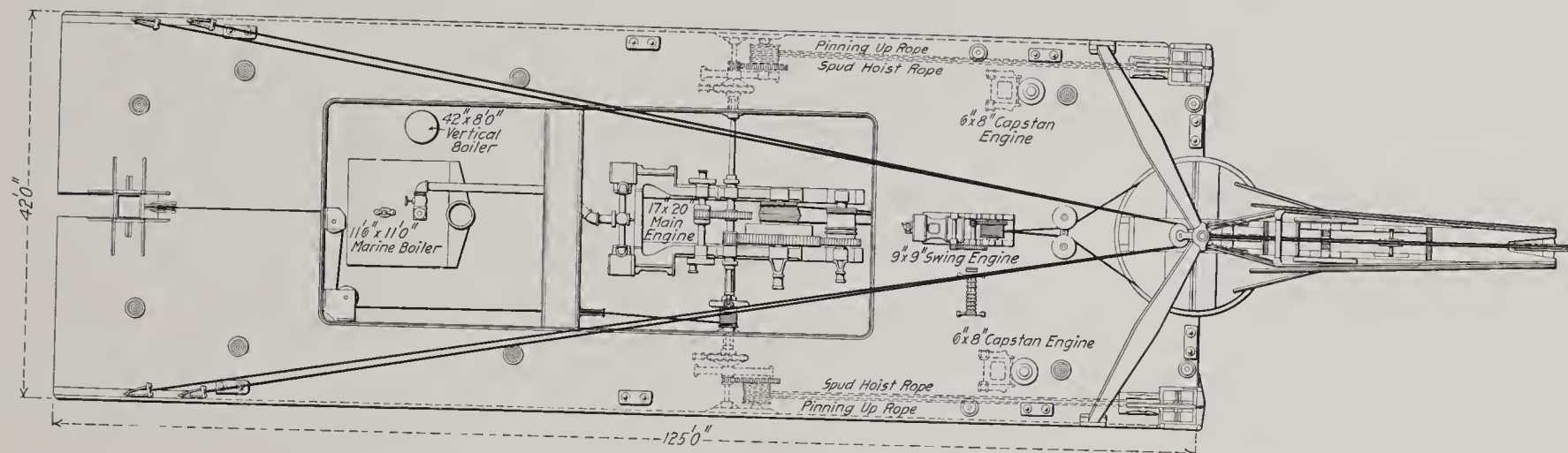
This dredge carries a dipper of 8 cubic yards capacity for soft material and also one of 5 cubic yards for rock. During the test it readily filled the 8-yard dipper every 30 seconds.

The illustration on the opposite page shows the 8-yard dipper dredge described on previous page more in detail. The simple and massive form of the boom, and the simplicity and directness of the swinging mechanism are clearly shown in the engraving; also the absence of the overhead steel truss often seen in dipper dredges on the lakes.

The deep steel truss is a relic of the days of wooden hulls, which required the truss to stiffen them. The hull of this dredge is stiffened internally against all possible strains and the deck and bottom plating are so arranged as to constitute the top and bottom flanges of an immense steel box-girder with four vertical webs. The steel hull is thus strong enough for all strains that can come upon it without the use of a deep truss.



SIDE ELEVATION OF EIGHT YARD DIPPER DREDGE BUILT FOR THE CUBAN GOVERNMENT



PLAN VIEW OF EIGHT YARD DIPPER DREDGE BUILT FOR THE CUBAN GOVERNMENT

On pages 12 and 13 are shown a plan and elevation of 8-yard dipper dredge, built for the Cuban Government. These show clearly the general arrangement of the various parts.

The main hoisting friction is of Robinson's patent radial toggle type with outside band lined with wood blocks. The friction band is of unusual width to give large bearing surface and is set up by steam cylinder, as are all the clutches and brakes.

All the gearing as well as all other important parts are of cast steel, the object being to construct a simple and strong machine which cannot be broken by rough usage or hard work. All parts of the dredge are designed to safely withstand the maximum pull of the engines when encountering immovable resistances with the throttle wide open and full head of steam.

THE ELEVATOR DREDGE



SEA-GOING ELEVATOR DREDGE

THE ELEVATOR DREDGE

On page 16 is illustrated a large sea-going elevator dredge. This type of dredge is adapted for either hard or soft material in exposed or tidal situations where wide areas are to be covered and large volumes of material dealt with. It is more sea-worthy than the dipper dredge on account of having no spuds and also than the hydraulic dredge on account of having no pipe-line. It requires plenty of sea-room and is not suitable for working in confined spaces.

A self-propelling elevator dredge similar to that illustrated has recently been built. The hull is 220 ft. x 36 ft. x 18 ft. and it is capable of dredging stiff material in 50 feet of water at a rate of 1,000 cubic yards per hour, loading into scows. It can make a cut 600 feet wide at one time and leave the bottom as level as a floor.

But few examples of this type of dredge exist in America principally because it is not suitable to the all-around purposes of the average contractor. It is a special machine suitable only for the class of work outlined above. Modern conditions are, however, tending towards special machinery and increased efficiency.



BUCKETS FOR ELEVATOR DREDGE

These dredges have been reduced to standard practice and the various details have been improved so as to produce a thoroughly reliable machine in which the cost of operation and maintenance is reduced to a minimum.

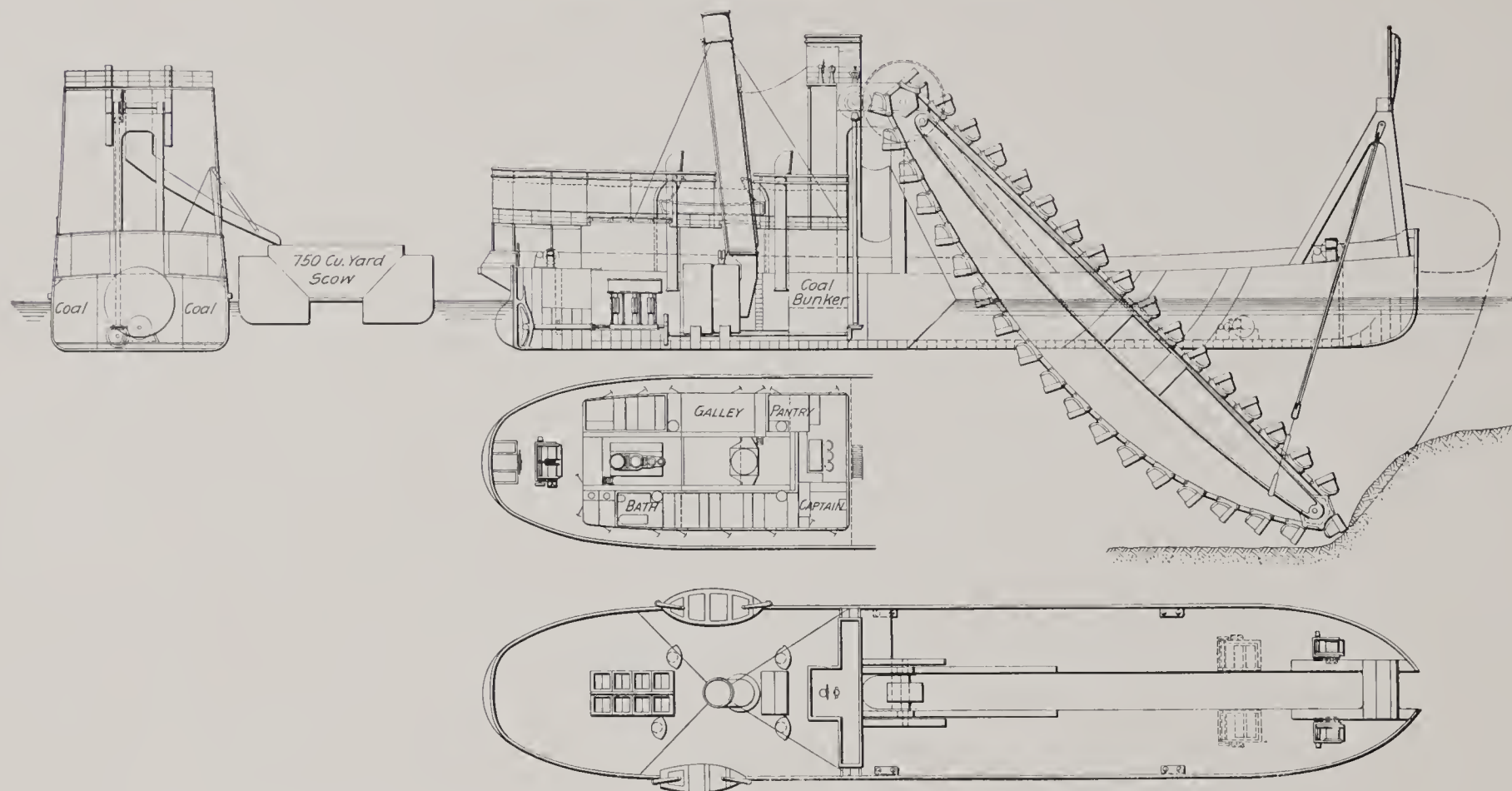
The illustration on page 18 shows some large buckets built for elevator dredges. They are $1\frac{1}{4}$ cubic yards capacity each, and have manganese steel lips 2 inches thick. The pins and bushing are also of manganese steel and renewable. The use of manganese steel for these important wearing parts has done much to improve their durability. The breaking strength of this chain of buckets is over 2,000 tons, giving a large factor of safety. The speed of these buckets is from 12 to 16 per minute, giving a rate of discharge of from 900 to 1,200 cubic yards per hour.

Note the tapering shape of the buckets giving good filling and emptying qualities.

The upper tumbler, on which these buckets run, is fitted with Robinson's patent removable wearing-plates, with extended faces, by means of which the driving power is effectively applied and the wear reduced.

This is the oldest known type of dredge and also requires the least power to drive it, all parts being in balance.

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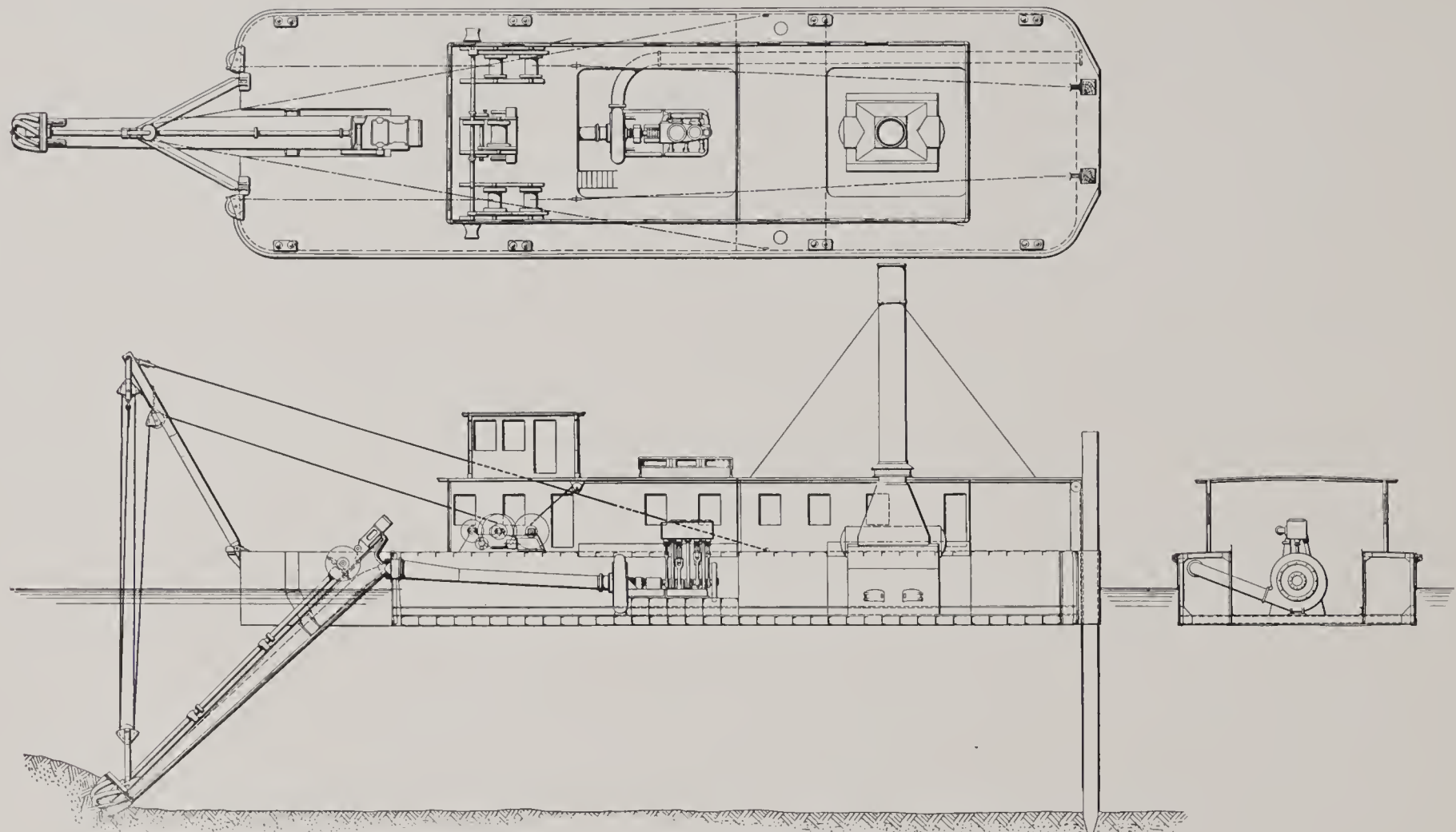
PLAN VIEW AND SECTIONS OF SELF-PROPELLING ELEVATOR DREDGE—OPEN-ENDED TYPE

On page 20 is shown a design of elevator dredge of the open-ended type for general harbor work in tidal waters. In this machine the propelling engines which are of the compound condensing type are also arranged to drive the buckets. The advantage of the open-ended hull is that the dredge can make its own flotation. This type of dredge as well as that illustrated on page 16 is anchored by chains or wire-ropes operated by winches so that the position and movement of the dredge is under control at all times.

The hull of this dredge is of steel; 168 feet long, 33 feet wide and 13 feet 6 inches deep. The maximum dredging depth is 42 feet, and the capacity rate is 800 cubic yards per hour. Steam is generated by one boiler of the marine type with three corrugated furnaces, and the engines are capable of indicating 400 horse-power.

This type of dredge can deal with stiff soils and stones, and cut over wide channels in tidal situations. It is, however, limited to loading scows as a method of disposal.

THE HYDRAULIC DREDGE



PLAN VIEW AND SECTIONS OF FIFTEEN INCH HYDRAULIC DREDGE

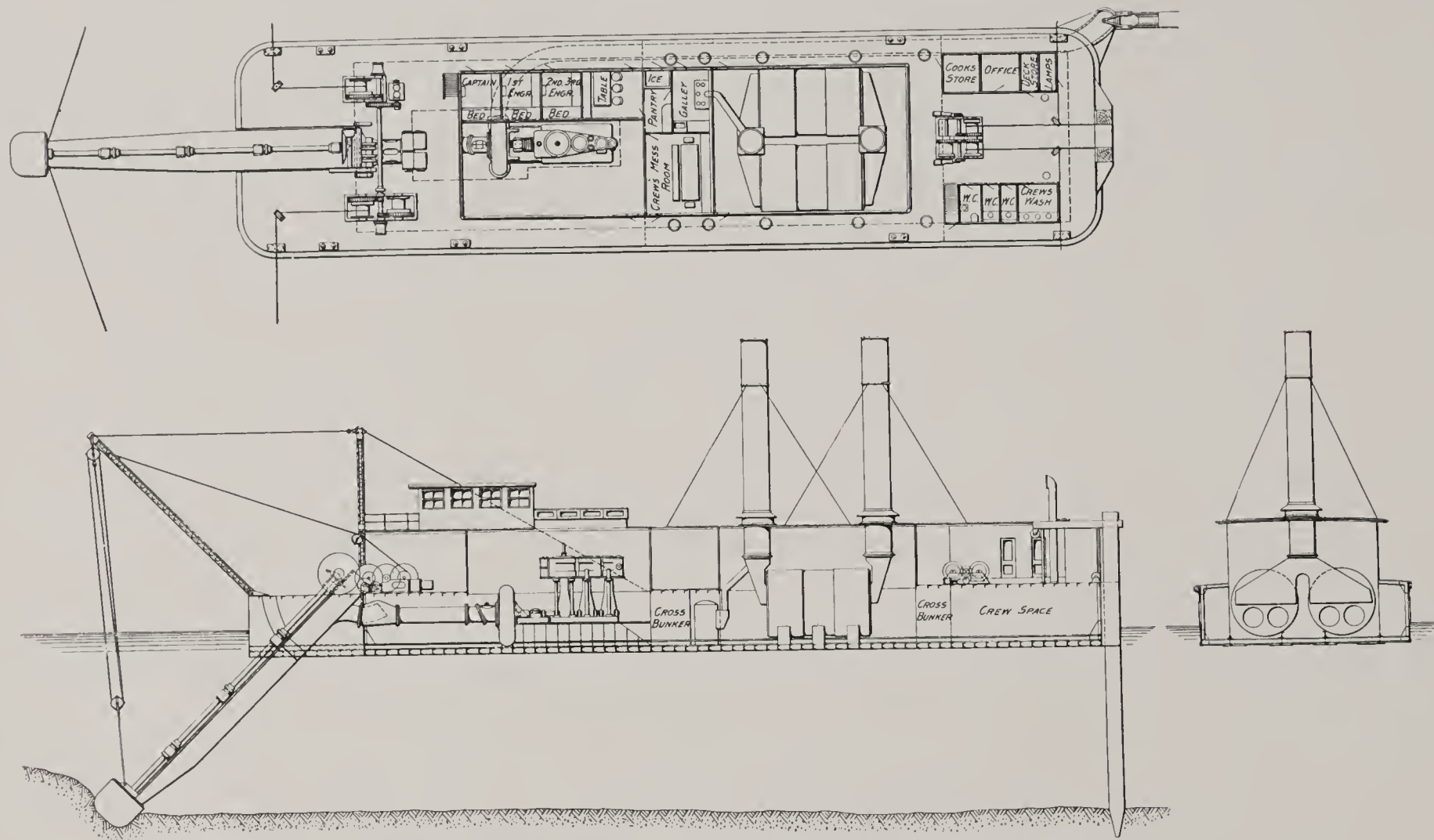
THE HYDRAULIC DREDGE

The hydraulic type of dredge is applicable to homogeneous material where it can be delivered by pipe-line. By homogeneous material is meant soil that can be cut or excavated and that is reasonably free from stones or other large obstructions. In its early forms the hydraulic dredge was limited to sand or soft mud that could be readily pumped in a fluid state, but later improvements in cutting apparatus have developed machines that can excavate any penetrable material and in which the hydraulic action is employed only for transport and disposal of the soil. The essential advantage therefore, in this type of dredge is that it dredges and disposes of the soil at one operation and moreover can transport it to considerable distances over land or water when necessary.

The various details entering into a dredge of this type are now well understood and the designs which are offered represent the latest and best practice.

On page 24 are shown the plan and sections of a 15-inch machine for general dredging work. This dredge has a steel hull and can dredge 350 cubic yards per hour from a depth of 25 feet and deliver it to any reasonable distance required. It is fitted with Robinson's patent cutter and driving

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PLAN VIEW AND SECTIONS OF TWENTY-FOUR INCH HYDRAULIC DREDGE

gear. In this case the cutter engines are placed on top of the suction frame and steam is carried to them by a swivel-jointed pipe. The suction frame is of steel and the entire dredge is of the most substantial description and adapted for continuous heavy work.

On page 26 is illustrated a 24-inch dredge, somewhat similar to the preceding, but of larger capacity. It is capable of dealing with clay soils and for this purpose is fitted with a special cutter of non-clogging type and of exceptional power both for driving and feeding. The main engines are of triple-expansion type of 750 horse-power, with boilers to correspond. The cutter engines are of the double tandem compound type located on deck, and are of 250 horse-power. This dredge can make a cut 150 feet wide at one time, when swinging on a stern spud; and in ordinary favorable material can deliver 800 to 1,000 cubic yards per hour to a distance of 1,500 feet.

On page 28 is illustrated the 30-inch hydraulic dredge "Francis T. Simmons" recently completed for the Commissioners of Lincoln Park, Chicago. This dredge was designed to reclaim land along the lake shore for park purposes. The material is stiff clay with some gravel and stones and is taken from the bed of Lake Michigan and pumped a distance of 1,000 to 2,000 feet and delivered within a stone revetment. For this purpose the dredge is constructed in a specially seaworthy manner and is

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THIRTY INCH HYDRAULIC DREDGE BUILT FOR THE COMMISSIONERS OF LINCOLN PARK, CHICAGO

fitted with a steel pipe-line capable of withstanding a heavy sea. This dredge has a steel hull of 148 ft. x 36 ft. x 12 ft. 6 in. and is capable of working to a depth of 35 feet. The main engines are of triple-expansion type and are of 1,200 indicated horse-power. The cutter engines are of double tandem compound type of 300 horse-power. All the motions of the dredge are controlled from a pilot house on the upper deck. Here are the levers and gauges, so that one man operates the entire dredge and has full view of his work.

This dredge has demonstrated its capacity to handle stiff clay and pump it long distances at a very rapid rate. The ordinary capacity is 1,500 cubic yards per hour.

This machine is noteworthy on account of possessing ability to dredge harder material and to maintain a floating pipe-line in rougher water than has heretofore been accomplished. These two features constitute a distinct advance upon previous practice and cannot fail to greatly extend the usefulness of this type of dredge.

The illustration on page 30 shows the 30-inch floating pipe-line used with the dredge described above.

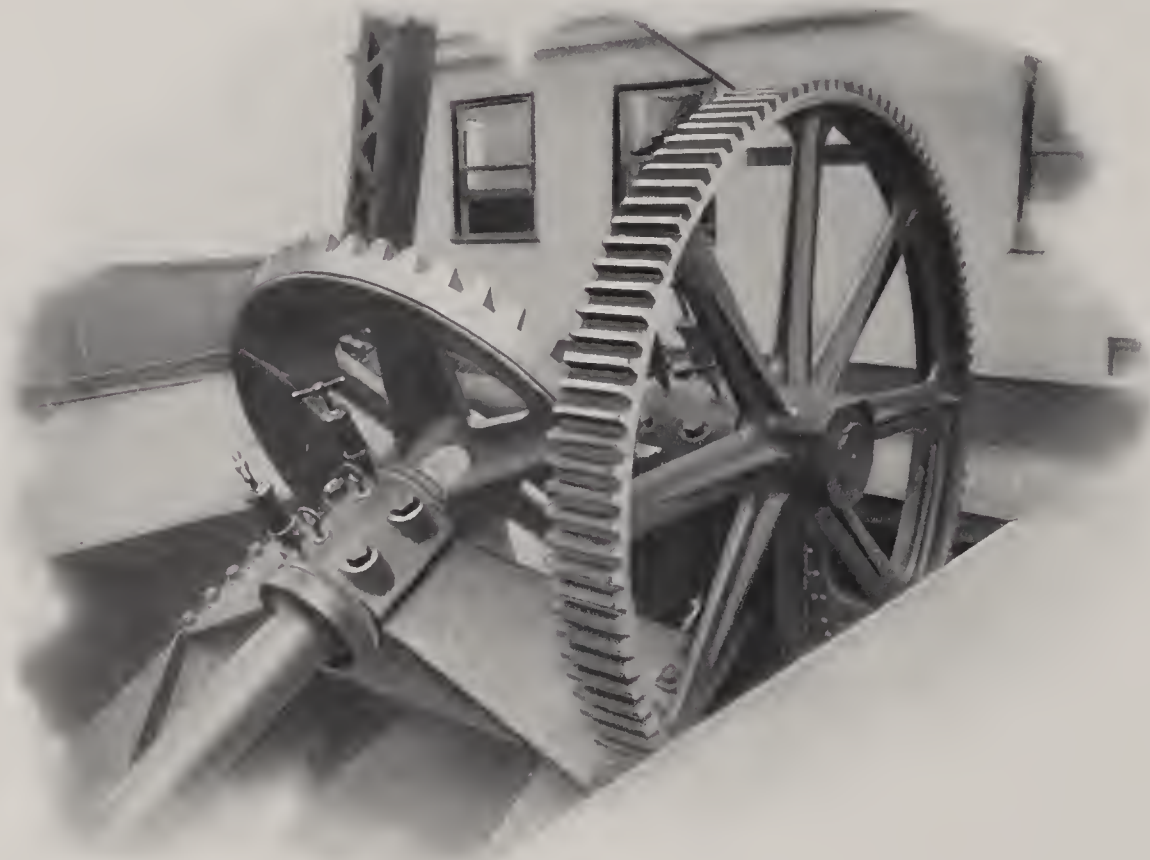
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VIEW OF PIPE-LINE OF THIRTY INCH HYDRAULIC DREDGE
BUILT FOR THE COMMISSIONERS OF LINCOLN PARK, CHICAGO

This pipe-line is formed of semi-submerged pontoons about 100 feet long, connected by ball-and-socket joints having spring connections of great strength. Long lengths of pontoons were necessary to give steadiness in waves and a yielding connection was essential to relieve the joints of the great stresses due to surging. The springs are of locomotive draw-bar size and are arranged similarly to railway car draft-rigging. There are also tension and compression springs to control the side deflection of the joint. In wave-action this pipe-line is very satisfactory. A special flange connection is provided at the dredge so that the pipe-line can be instantly disconnected from the dredge at any time by simply pulling out a toggle-lever. On several occasions when it became too rough for the dredge to work owing to the difficulty of discharging over the breakwater, the pipe-line was disconnected and towed to the harbor by a tug through a rough sea which broke over both tug and pipes continuously with no harm whatever to the pipe-line. These occasions, however, are relatively rare and the operation of the dredge has proved not only that the clay of the bed of Lake Michigan can be dredged by this method, but also that the seaworthiness of both dredge and pipe-line is sufficient to reduce the delays on account of weather to a comparatively small amount.

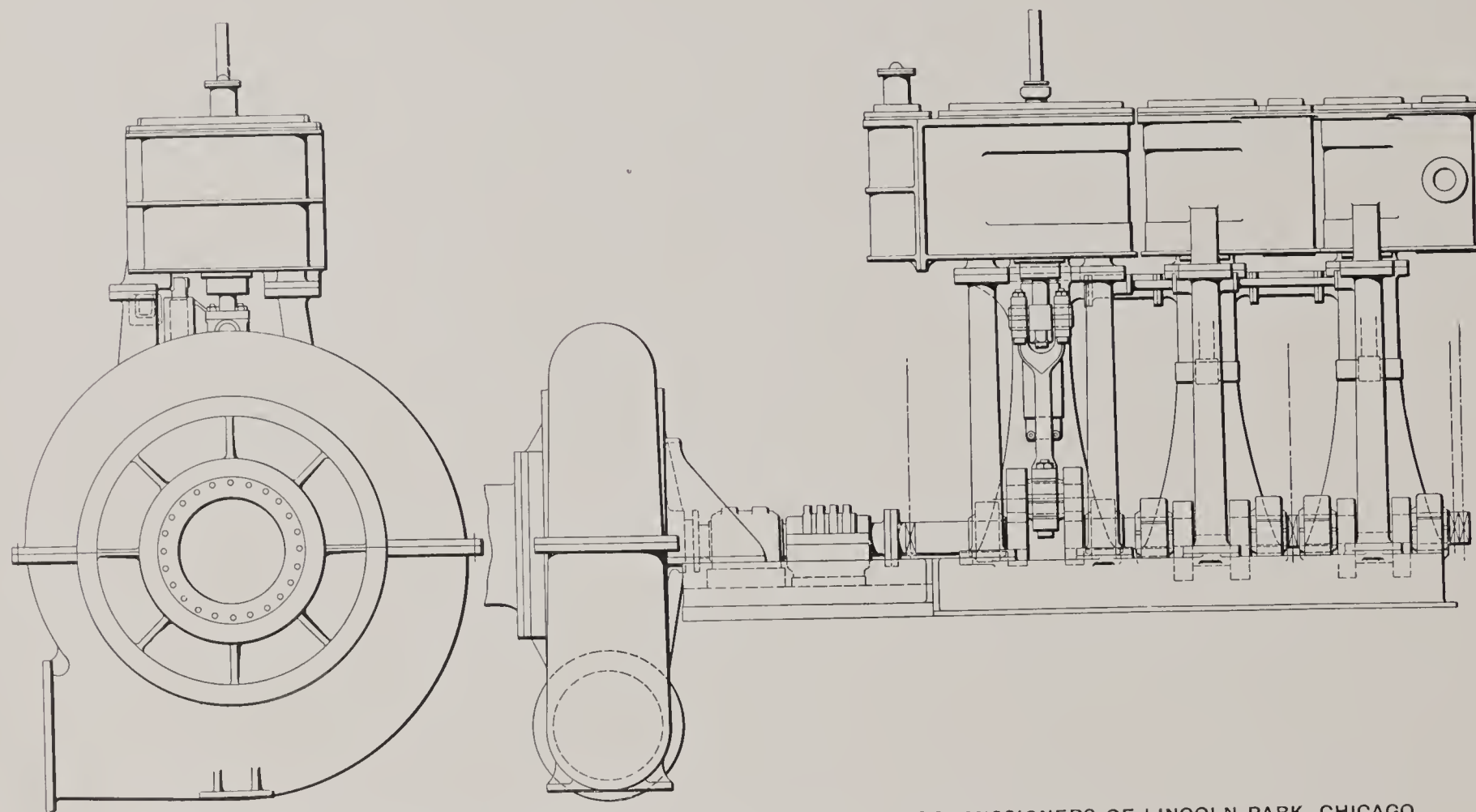
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CUTTER GEARING USED ON HYDRAULIC DREDGE
BUILT FOR THE COMMISSIONERS OF LINCOLN PARK, CHICAGO

The illustration on page 32 shows the upper end of the suction frame and steel gearing employed to drive the cutter. The engraving clearly shows the simplicity and strength of all the parts and the fact that all the gearing and machinery is easily accessible and above water. The suction-pipe is carried by a very strong steel frame formed of double plate girders rigidly braced together. The cutter shaft is of the best hammered steel, 9 inches diameter, with the flange couplings solid forged on the shaft. The cutter is an improved development of a number of earlier machines and has demonstrated its efficiency by being able to handle the heaviest clay up to the full capacity of the pump. It is 9 feet in diameter and weighs about 9 tons being formed of eight steel blades of peculiar curvature cast in one piece and having renewable hard steel cutting edges attached. The mechanism for driving and feeding this cutter is of the most powerful description. The secret of success of this dredge is that the excavation of the stiff clay is done by an efficient cutting tool that will not clog and provided with a powerful feed, the main pump being only employed for transportation of the spoil.

The cut on page 34 shows the main engines and pump used for a 30-inch hydraulic dredge. The engines are of triple-expansion marine type and are designed to indicate 1,200 horse-power with a



MAIN ENGINES AND PUMP USED ON HYDRAULIC DREDGE BUILT FOR THE COMMISSIONERS OF LINCOLN PARK, CHICAGO

working pressure of 160 pounds and vacuum of 25 inches. The engines are of the best marine design and construction throughout and are built in accordance with best marine practice. Piston valves are employed for the high pressure and intermediate cylinders; while a flat sliding valve is fitted to the low pressure cylinders. The pump is of Mr. Robinson's latest design and is fitted with adjustable wearing rings at suction inlet which maintain a close contact with the opening into the revolving runner, thus contributing greatly to the efficiency of the pump. It is well known that great wear exists at this point, and that when worn the efficiency of the pump falls off rapidly. This wearing ring is easily replaced and can be set up at any time without stopping the pump. The passages through the pump are unusually large and are of greater width than the openings into the cutter so that any large pieces of solid matter which may enter the cutter will assuredly pass through the pump without clogging. By a special construction of the pump it is practically balanced against end thrust; nevertheless, in order to maintain the crank shaft of the engines absolutely free from end motion, a multiple collar self-lubricating thrust bearing is fitted to it. The entire pump and engines are self-contained on one bed-plate so that there is no possibility of the shaft getting out of line.

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THIRTY-SIX INCH HYDRAULIC DREDGE

HOLDER OF WORLD'S RECORD—757,000 CUBIC YARDS OF BLUE CLAY DREDGED 35 FEET AND DELIVERED 2,300 FEET IN ONE MONTH

The illustration on the opposite page shows a large hydraulic dredge which was built from designs by Mr. Robinson and which holds the world's record for performance. This record is 757,000 cubic yards of blue clay dredged from a depth of 35 feet and delivered 2,300 feet distant, which work was accomplished in one month. The discharge pipe of this dredge is 36 inches diameter and is constructed of special strength for withstanding heavy storms.

The hull of this dredge is of steel 160 feet long by 42 feet beam by 12 feet 6 inches deep and is anchored entirely by wire-rope lines, no spuds being used. The suction pipe and cutter works through a well in the centre of the vessel and the maximum dredging depth is 42 feet. This dredge can make a cut 700 feet wide at one time and is employed in deepening the ship channel of the river St. Lawrence.

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THE GOLD DREDGE

ATLANTIC EQUIPMENT COMPANY



GOLD DREDGE

THE GOLD DREDGE

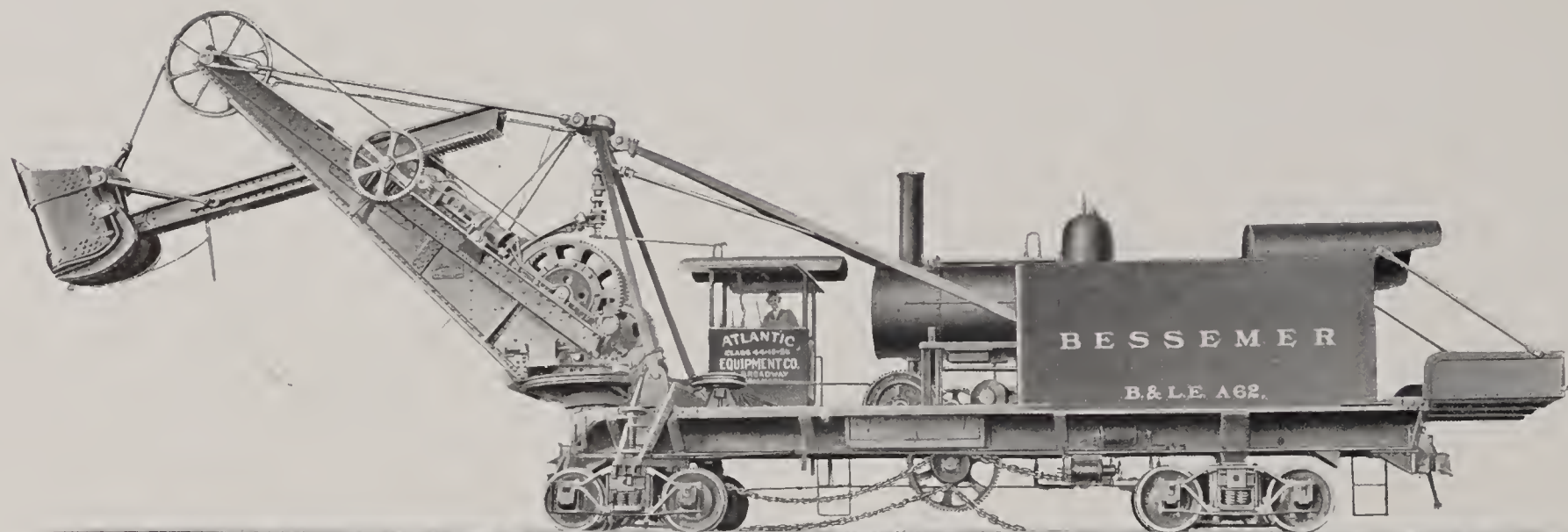
On page 40 is illustrated a $3\frac{1}{4}$ -cubic foot gold dredge. The building of gold dredges is an industry in itself and is the development of special experience along this line. This illustration is introduced in order to indicate the general type. They are built in several sizes and with variously arranged details to suit the special conditions under which they have to work.

The introduction of gold dredges into the United States on a commercial scale dates from 1895. In that year a small electrically-operated dredge was installed on Grasshopper Creek, at Bannack, Montana. This dredge was built from Mr. Robinson's designs and was the precursor of several others in the same locality, all of which did well and made money for their owners. These early dredges represented a combination of dredging apparatus with an hydraulic sluice-box, and in both these elements the original separate forms were adhered to. The dredge was of a type and detail which had been successfully used by Mr. Robinson for river and channel dredging, and the sluice-box was similar to that long used by miners in hydraulic mining.

The elevator type was soon recognized as the most successful one for gold dredging, and the history of many experiments with others is one of failure.

In the present design the aim has been to produce the very simplest construction of working parts that will accomplish the desired result, and to maintain a large margin of strength as well as durability. All the best features of both New Zealand and American practice have been retained, and complications and weight reduced as far as practicable by correct design and the use of high grade steels, with as little cast iron as possible. The result is a dredge that is light, strong, easily handled, economical to transport and erect, and that can be depended upon to do its work continuously and with light repairs. This dredge made a run of 76 per cent. actual working time during her trial period of 30 days. The total delays thus amounted to 24 per cent. of the time and included all the time lost in adjusting the new machinery and in correcting small defects, which when once done would not occur again; so that it can be correctly assumed that in regular work much better time will be made. Old established dredges, on regular runs, seldom average more than 75 per cent. running-time on account of incidental and unavoidable delays.

STEAM SHOVELS AND LOCOMOTIVES



ATLANTIC STEAM SHOVEL; CLASS 44-16-2 I-2—BUILT FOR THE BESSEMER AND LAKE ERIE RAILROAD
NOW AT WORK AT GREENVILLE, PENNSYLVANIA

ATLANTIC STEAM SHOVEL

On page 44 is illustrated our standard "Atlantic" type steam shovel. These are built in various sizes and are in extended use by all the leading railway companies and contractors. In this machine a distinct advance over previous practice has been made in the use of Robinson's patent system of hoisting machinery, by which the hoisting machinery is mounted on the base of the boom and a direct lift obtained with two parallel parts of hoisting rope passing over a single sheave. The gain in efficiency with this type of shovel has been marked, and the fact that the greater number of sales recently made are repeat orders from satisfied purchasers speaks for itself. A special catalogue describing these steam shovels will be sent upon request.

ATLANTIC EQUIPMENT COMPANY



STANDARD FOUR WHEEL SADDLE TANK LOCOMOTIVE
FOR CONTRACT WORK, QUARRY, MINE OR INDUSTRIAL SERVICE

SMALL LOCOMOTIVES

On the opposite page is illustrated one of our standard designs of small locomotives suitable for contract work, quarries, mines and a variety of service where light rails, uneven roadbed and sharp curves require a short rigid wheel base and all the weight available for adhesion. These locomotives are built in various sizes to standard designs, and the parts are made to gauges and templates, thereby absolutely insuring interchangeability of parts in locomotives of the same class.

A number of locomotives of the type illustrated are kept in stock ready for immediate shipment.

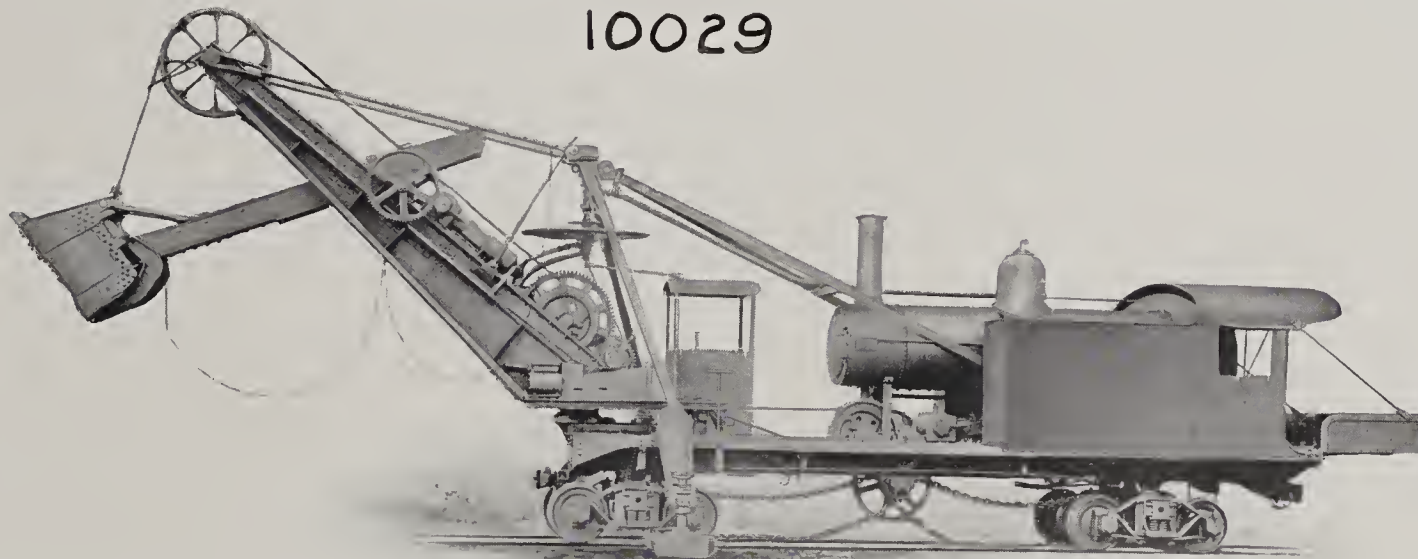
Our different standard types and designs of small locomotives are fully illustrated and described in a special catalogue devoted to the subject.

Press of The F. A. Bassette Company
Springfield, Massachusetts

ATLANTIC EQUIPMENT COMPANY

111 BROADWAY, NEW YORK
RAILWAY EXCHANGE, CHICAGO

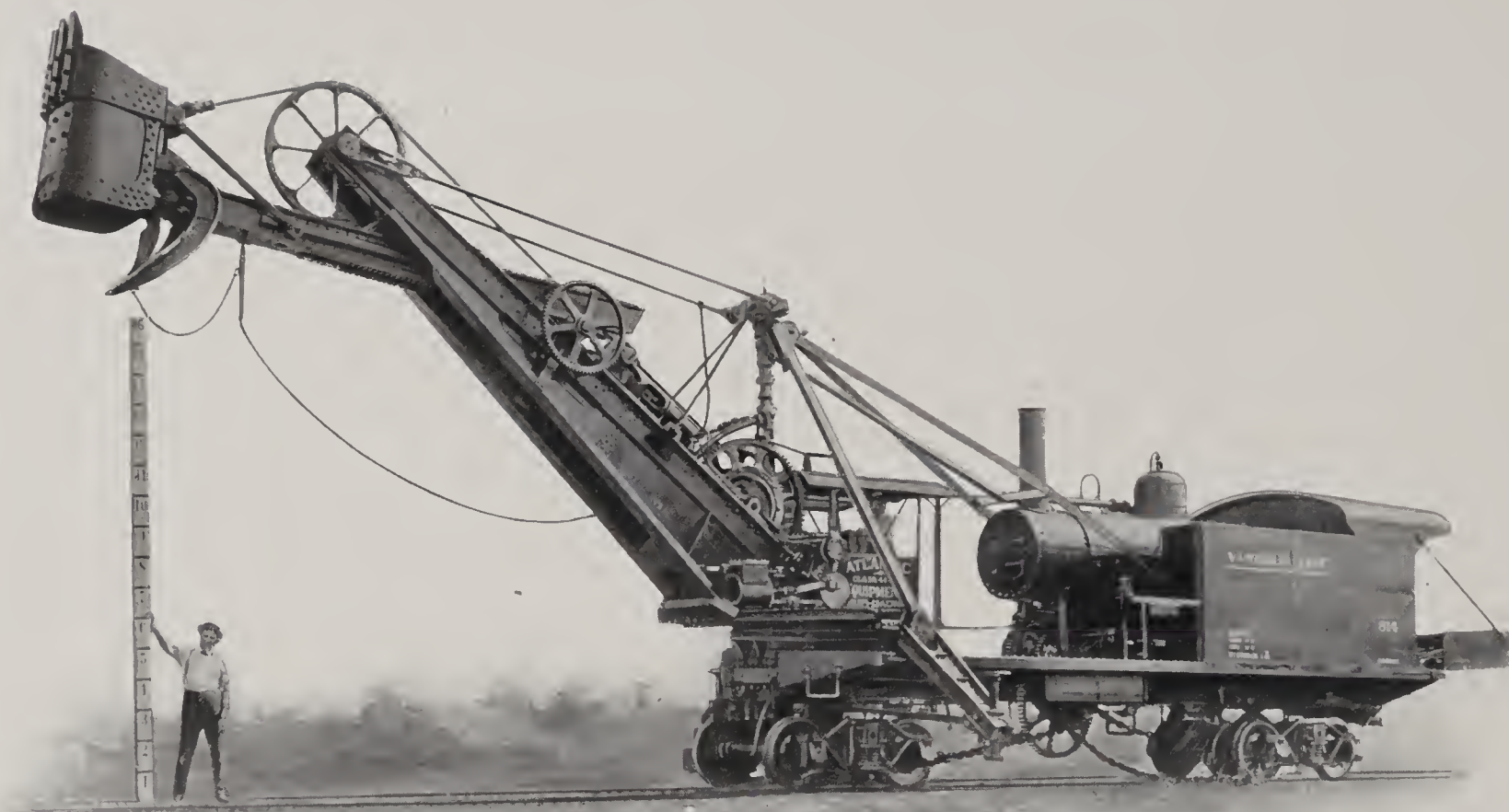
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ATLANTIC STEAM SHOVEL

BUILT BY AMERICAN LOCOMOTIVE COMPANY

[The Code Word for this Pamphlet is "CALEBASSE."]



Atlantic Steam Shovel, Built For The Vandalia Line.
Clear Height Of Lift 16 Feet.

ATLANTIC EQUIPMENT COMPANY

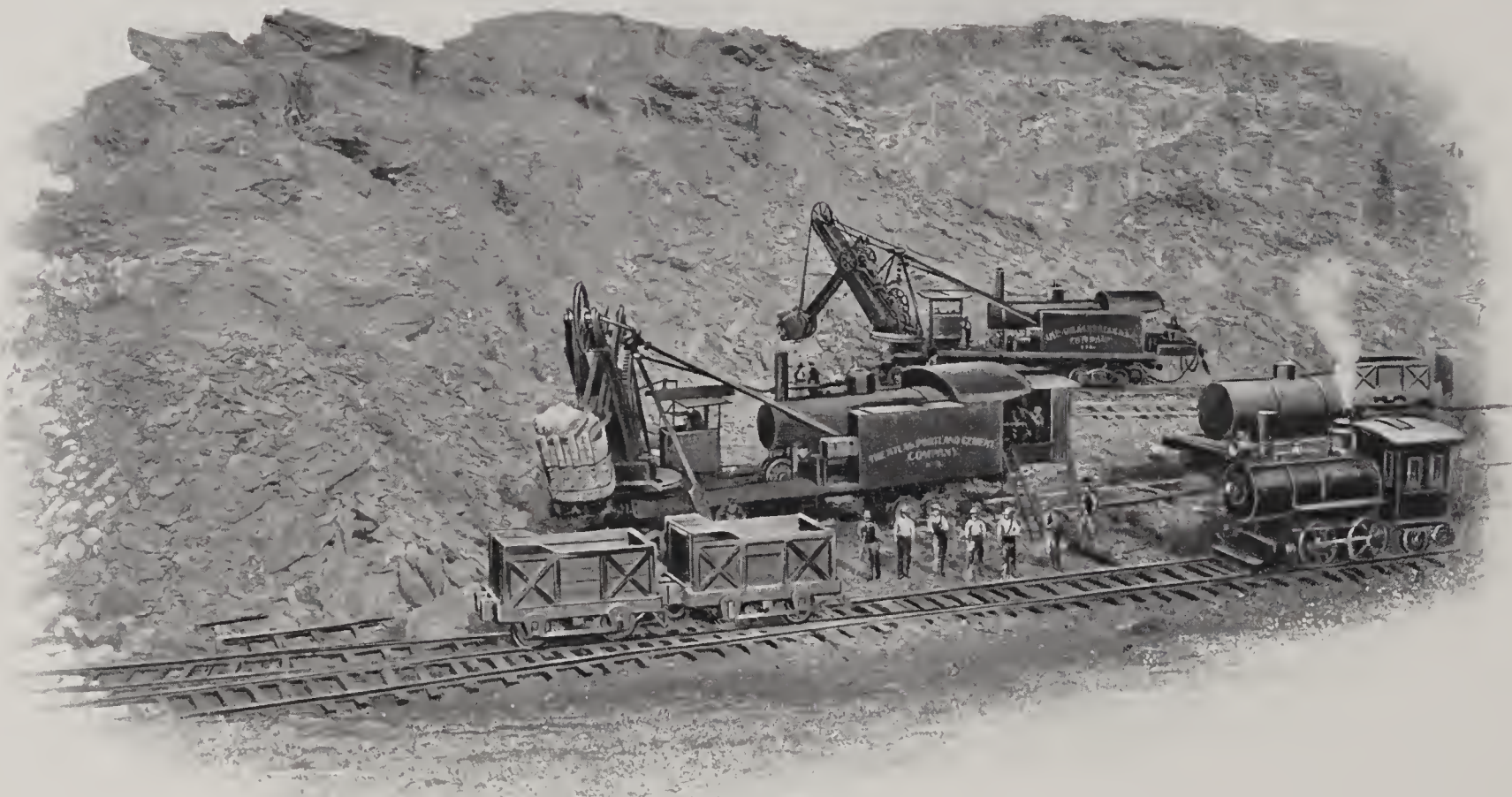
Atlantic Steam Shovel



THE GREAT expansion that has taken place in power and capacity of locomotives and rolling stock of railways now finds its counterpart in the necessity for corresponding increase in power and capacity of the steam shovel. Ten years ago the standard railway shovel weighed 35 tons and carried a dipper of $1\frac{1}{2}$ cubic yards capacity; now shovels are in use which weigh 90 tons and carry a dipper of 5 cubic yards capacity. Mere weight and size, however, do not give efficiency in service. Great weight, which is necessary in a locomotive, is a disadvantage in a steam shovel, because it not only makes it cumbersome and difficult to hold up on temporary rails and soft ground, but also makes it slow of movement.

The Atlantic Steam Shovel has been designed to fulfill the following requirements, which are primarily intended to cover the conditions of modern railway work:

1. Simplicity of design, with direct strain, few and strong parts that will not break or easily get out of order.
2. The highest possible speed and power consistent with safe and effective working.
3. Avoidance of wear and breakage of chains and sheaves.
4. Moderate weight.
5. Better and more efficient boiler for easy steaming and economy of fuel.
6. The employment throughout of the highest quality of design, materials and workmanship, fully equal to the best locomotive practice.



Atlantic Steam Shovels, Built For The Atlas Portland Cement Company.
At Work In Blasted Rock At Northampton, Pennsylvania.

ATLANTIC EQUIPMENT COMPANY

All these points and many others of excellence that are described herein and that will commend themselves to practical men are incorporated in this shovel. It has been designed by Mr. A. W. ROBINSON, M. Am. Soc. C. E., is the result of many years' experience in the design and operation of steam shovels and dredging machinery of all kinds, and includes all the more desirable features of the best modern practice in shovel-building.

A new shop, with an organized system for manufacturing in quantity, has been installed by the American Locomotive Company so that we are prepared to fill orders promptly.

Our aim is to produce a high class and powerful machine that will be absolutely reliable under all conditions of service. Our shovel is the smoothest running, easiest steaming, speediest, and most scientifically built to-day.

The Canadian Pacific Railway, after an exhaustive test alongside the best shovels of other makes, have adopted ours as standard on their road and have now twenty-three in service. This test showed that the Atlantic type shovel on a twelve hour run loaded 39 per cent. more material than the other shovels, and did it on 79 per cent. of the fuel.

We will give to parties interested the names of users of our shovels, as we believe that information obtained directly from those who have had experience with them will be more satisfactory than any number of testimonial letters that we might print.



Atlantic Steam Shovel, Built For The MacArthur Brothers Company.
At Work On Approaches To Allegheny Tunnel On The Tidewater Railway.

ATLANTIC EQUIPMENT COMPANY

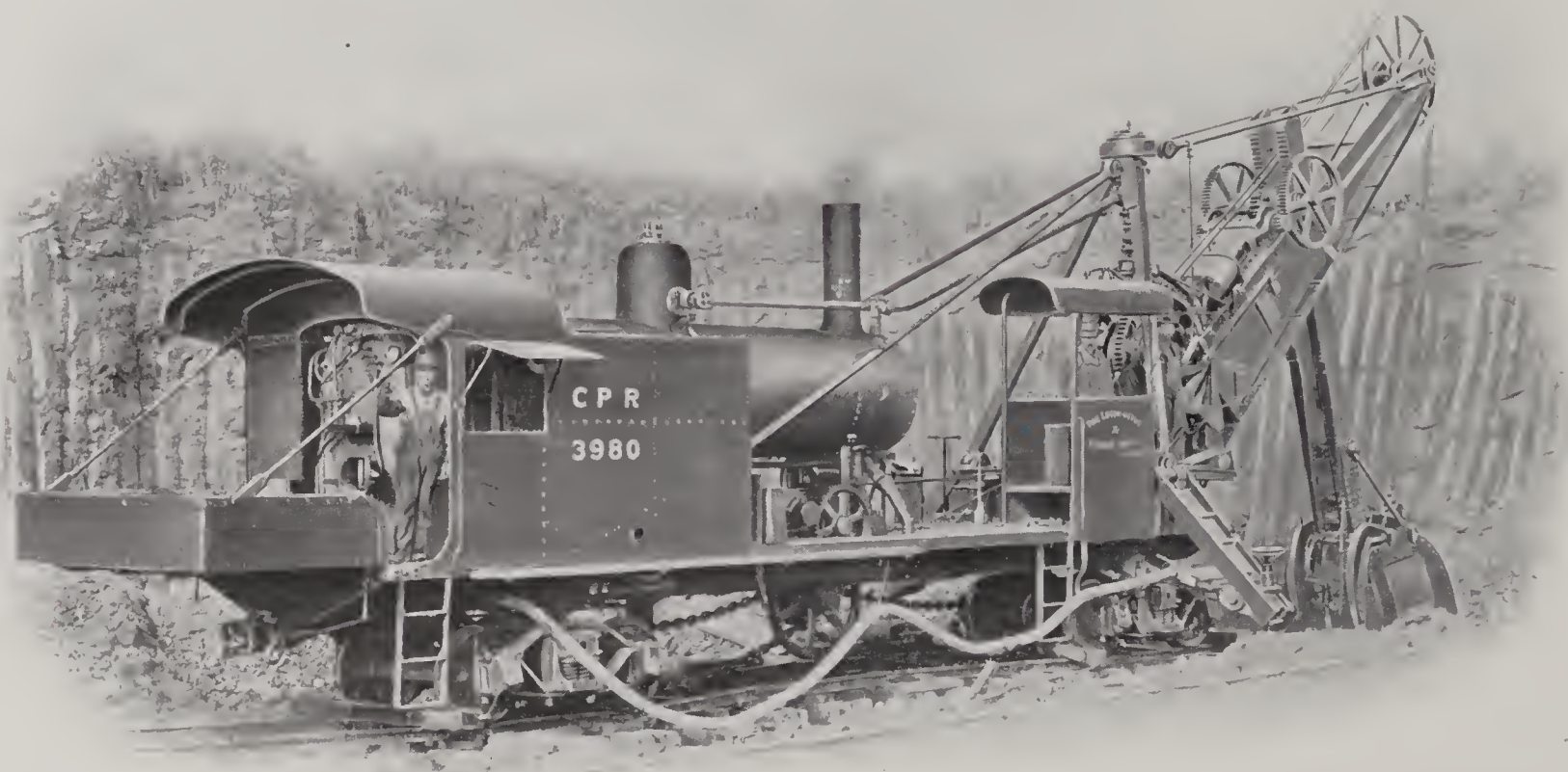
Description of the Atlantic Shovel

CLASSIFICATION The Class Numbers of these shovels indicate the three variable elements of size; pounds pull, height of lift, and capacity of bucket. Any combination, therefore, of these three elements can be suitably expressed. For example: a shovel having a pull upon the dipper of 44,000 pounds, a clear height of lift of 16 feet and a capacity of dipper of $2\frac{1}{2}$ cubic yards would be Class 44-16- $2\frac{1}{2}$.

C A R The car frame is formed of heavy steel beams rigidly bound together into a solid platform. The two central beams are of extra depth and close together, thus concentrating the principal strength into the centre of the car. All the heavy strains and all of the attachments of the machinery are concentrated on these central beams, which, when close together, furnish better support for the base of the boom, the draft rigging, the truck and centre bearings, the swinging engines with their shorter shafts, and the boiler. The jack-arm tension members are attached centrally to a strong transverse truss, so that the heavy tension and compression of the jack-arm members do not come upon the structure of the car.

A-FRAME This is formed of solid steel bars, having solid forged pin-connections at feet and a cast steel head. The A-frame is stepped upon the ends of the jack-arm truss in such a way that it forms a continuation of the jack-arms, giving great stability and relieving the car frame from strains. This type of frame is similar to that first designed by Mr. Robinson in 1892, and exhibited at the World's Fair in Chicago. It has since been widely imitated. The A-frame head is of new design and arranged so that the three strains intersect in a point. This is accomplished in no other shovel and obviates all lateral bending strains which lead to breakage.

The A-frame can be lowered, when required for transportation over the road, to 15 feet above the rail.



Atlantic Steam Shovel, Built For The Canadian Pacific Railway.
At Work In Stiff Clay Bank.

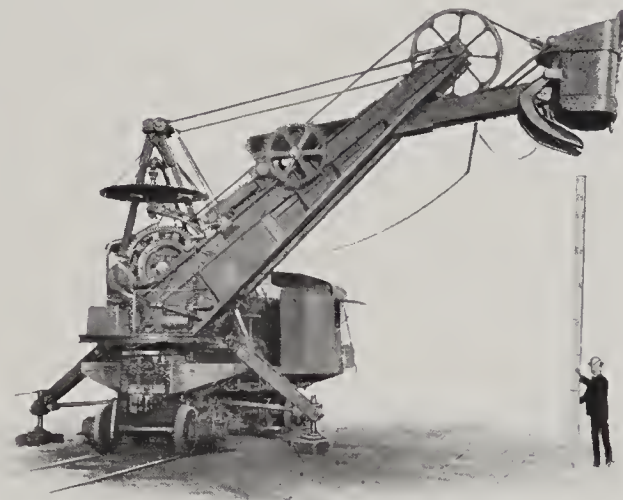
ATLANTIC EQUIPMENT COMPANY

The pin-connections at feet of A-frame permit of this movement and the back guys are shifted forward to a connection provided for the purpose. The raising and lowering of the A-frame can be done by power from the swinging engines.

BOOM In the boom there is a departure from the usual practice by making it with a straight taper, deepest at the inner end. This form is the simplest and most direct that can be devised, giving the greatest strength where it is needed, and the least weight at outer end where there is greatest motion. The most severe strains in a boom are those due to twisting when swinging rapidly, and in irregular work caused by the leverage of the dipper handle. It is essential, therefore, that the lower flange of the boom should have its greatest strength in a horizontal or lateral direction. This strength can be readily attained with light weight when the lower member is straight, but it is manifestly weak if the lower member is curved. In this shovel the upper members of the boom are steel channels set vertically and the lower members channels set horizontally, while the web is a solid steel plate.

The turntable is built solid with the boom, being made of stiffened steel plates and a rolled rim. The turntable and boom as a unit have perfect freedom of action, being separate from the revolving collar on the base.

The boom in this shovel is much shorter to accomplish the same height and reach, compared with other



Measuring Pole, 16 Feet.



Atlantic Steam Shovel, Built For The Vaughan Construction Company.
At Work In Blasted Rock On The Norfolk & Western Railway Near Roanoke, Virginia.

ATLANTIC EQUIPMENT COMPANY

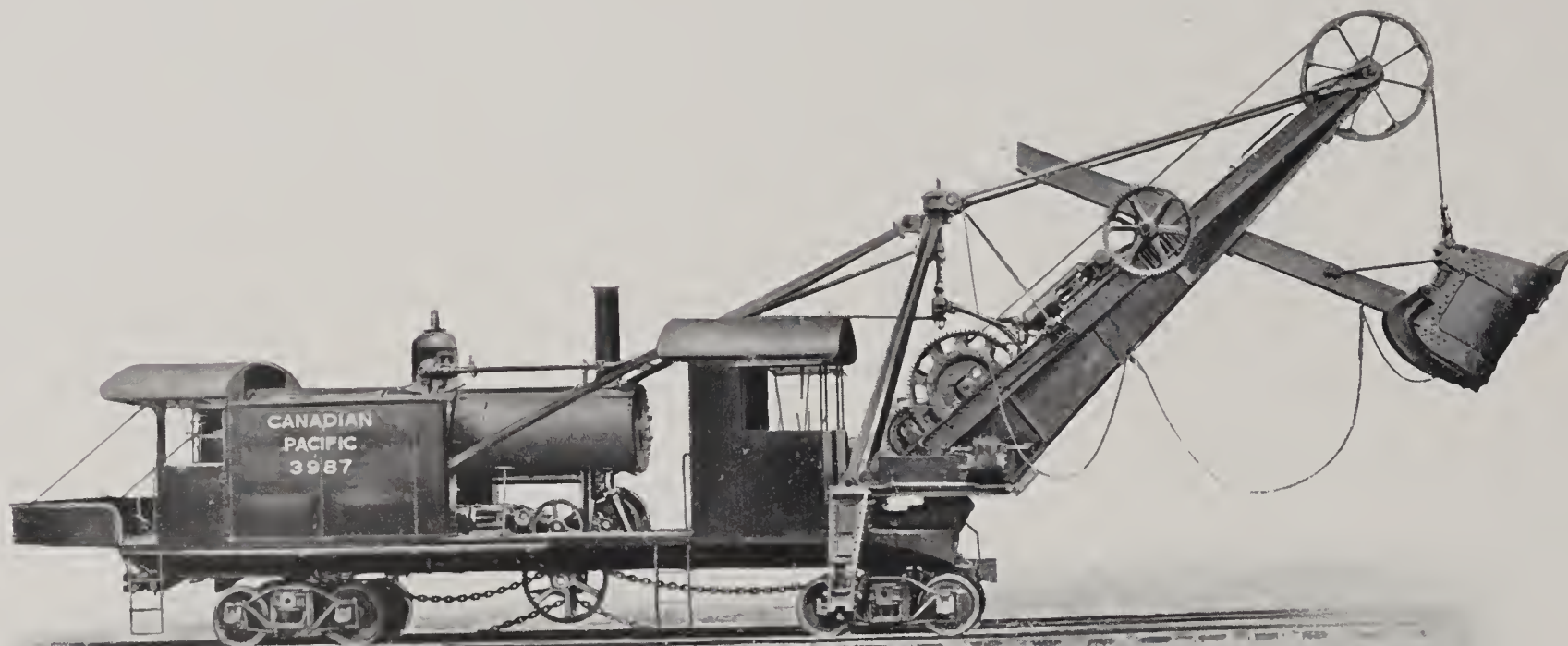
shovels, and is of less weight and can swing more readily with less strain to the machine. The principal weight is at the inner end of the axis of revolution, where it offers no resistance to rapid swinging. A shovel with a long and heavy boom creates heavy strains due to its weight and inertia, leaving little margin for effective work.

HOISTING MACHINERY

In this, also, there is a radical departure from old methods. The hoisting is done by direct wire rope with but one sheave, instead of by chain with from five to seven sheaves, as is usual. The advantage of this is apparent at a glance. Direct wire rope for hoisting has been successfully used in large dipper dredges for some time and Mr. Robinson's work in this direction is well known. It has long been the desire of shovel-builders to produce a successful wire rope shovel, but the difficulty of driving the rope from the drum to the dipper with several large sheaves has been insuperable. In this shovel the hoisting machinery is mounted directly upon the boom so that no guide sheaves are necessary, and the power is applied in the most direct and simple manner, and with the least possible loss. A pair of engines, with drum and gearing, is incorporated into the base of the boom, that take up very little room, can pull the required amount on the dipper at a speed of five or six dipper loads per minute, and in which all parts are adequate for continuous heavy work and easily accessible.

The entire frame of the engines is of cast steel in one piece, and forms the foot of the boom and centre of the turntable as well. While the weight of the engines and gearing is not great, it is located on the axis of rotation of the boom, and therefore does not appreciably increase the power required for swinging nor interfere with the speed.

The base plate attached to the car is of cast steel with a revolving collar bearing a large surface so that it



Atlantic Steam Shovel, Built For The Canadian Pacific Railway.
Twenty-three Of These Shovels Are Now In Operation On This Road.

ATLANTIC EQUIPMENT COMPANY

will run a long time without appreciable wear. The feet of the boom are stepped into sockets in this collar-bearing so that all necessary freedom is allowed.

It may be objected that the added weight of the hoisting engines on the front end is a disadvantage, but as the turntable centre and boom foot, in this case, constitute the engine frame, one casting takes the place of four or more with the usual construction and with less total weight. The load at the base of the boom due to weight of the parts is not more than ten per cent. of the load due to working stress. It is therefore but trifling. A most important function for this weight is to balance the boom and loaded dipper in side position against overturning. This weight at the base of the boom is more effective for this purpose than weight in the middle of the car which is not opposite the load.

Experience with these shovels has demonstrated the fact that they are easier to hold up on soft ground than the older types.

MAIN ENGINES

These are of locomotive type with outside cylinders. They have a solid cast steel frame for both engines in one piece, and steel crossheads, with all parts easy of access. Steam is carried by a pipe having a double ball-and-socket joint on top centre, and the exhaust is carried to the smoke-stack by a pipe through the bottom centre.

HOISTING DRUM

This is of large diameter, grooved for steel wire rope. There are two parallel ropes each bearing half the load, equalized round a small sheave or thimble at the dipper. The two ends of the rope are secured by clips at the drum, so that there is really but one rope, and attached in such a way that the rope can be removed and replaced without delay. The cost of renewal of a steel rope is less than one-fifth that of an equivalent chain. The rope will last fully as long as the chain, as there is



Atlantic Steam Shovels, Built For The United States Reclamation Service.
Being Moved Across Country To Nampa, Idaho.

ATLANTIC EQUIPMENT COMPANY

but one sheave. It will give warning of weakness due to wear before it breaks, while a chain snaps without warning. It is noiseless. It is far more efficient than a chain, consequently will do more work with less power. It is lighter and will run faster. It can be replaced without loss of time, as the time of renewal can be chosen at a favorable opportunity. For these reasons the rope is more desirable than chain, without considering the reduced cost. The hoisting drum is driven by two steel gears and two band friction clutches operated by steam. The clutch and throttle are controlled from the runner's stand on the car.

DIPPER In the construction of the dipper, the bail and sheave have been discarded and the double hoisting rope attached directly to the back of the dipper, in such a way that the lines of force meet in a point situated in the plane of the resistance, or in line with the strain applied to the teeth. Several important advantages are gained by this.

1. Bending moment on the dipper-arm is eliminated.
2. The full mouth of the bucket is free for large boulders.
3. The dipper is stronger, lighter and has fewer parts.
4. The dipper can be lifted to a much greater height and reach in proportion to the length of the boom.

By the old method it would require a boom 6 feet longer to lift the dipper to the same height. This, therefore, means also a reduction in length, weight and swinging resistance of the boom, and consequently a better and speedier shovel.

The entire back of the dipper is one piece of cast steel with lugs formed upon it to receive the dipper-arm, hinges for doors, etc. The lip and teeth of the dipper are exceptionally strong and attached so as to be easily renewable.



Atlantic Steam Shovel, Built For The MacArthur Brothers Company.
Working In Blasted Rock Near Norfolk, Virginia.

ATLANTIC EQUIPMENT COMPANY

THRUSTING ENGINES

These are well and favorably known as the best method of feeding the dipper to its work. By their use the cranesman has absolute control of the dipper and can cause it to fill every time while in a proper bank. These engines are solidly built with bed-plate in one piece and well bolted to the boom. The gearing is of steel and the engines are reversing by means of central valve.

These engines are of new design and are entirely enclosed, with no rocker-arms, valve spindles, etc., exposed, as in other designs. There is nothing about these engines that can be easily injured by flying fragments from blasting.



7 x 8 Thrusting Engines.

SWINGING ENGINES

These are independent, reversible engines, duplicates of those on the boom for thrusting, and double-gearred to a drum. The drum carries double steel wire ropes on each side, which are connected to the turntable.

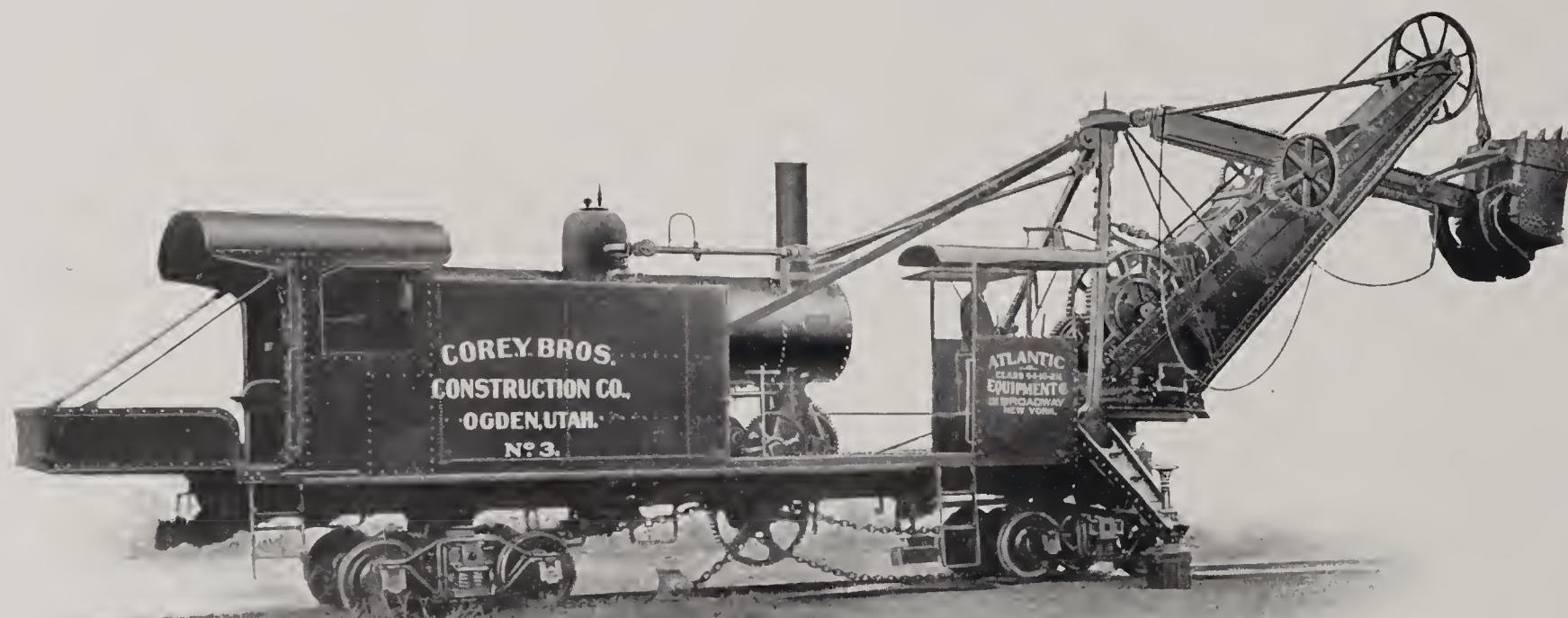
PROPELLING MOTION

This is performed by the swinging engines, power being transmitted to a cross shaft underneath the car. This shaft is connected with the forward and rear axles by two chains of great strength, sufficient to slip the wheels.

The swinging and propelling shafts are all short and strong, being attached to the main central beams of the car which are close together.

BOILER

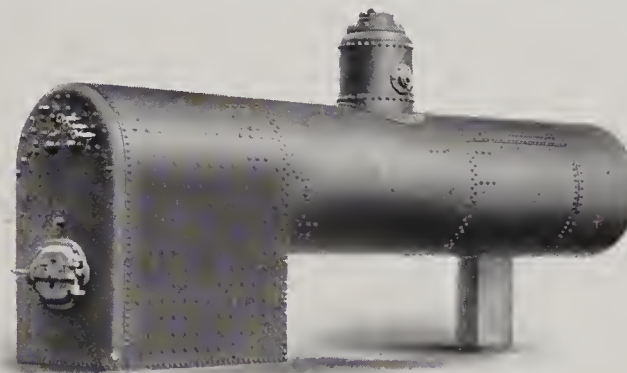
In the ordinary type of shovel the car is crowded with the main engines and other machinery, and the boiler is squeezed into the space that is left. In this shovel there is room for a first-



Atlantic Steam Shovel, Built For The Corey Brothers Construction Company.
Now At Work Near Garniel, Montana.

ATLANTIC EQUIPMENT COMPANY

class locomotive boiler and the greatest care is bestowed upon its design and workmanship. It is large enough for a locomotive of twice the cylinder capacity of the steam shovel, and is therefore easy steaming. It is built for a working pressure of 125 pounds. This shovel should not be compared with other shovels as to power and cylinder capacity without taking into account the fact that the efficiency of the direct wire rope hoist is about 90 per cent., while indirect chain hoist with three parts is not over 50 per cent. to 60 per cent.



Locomotive Boiler.

COVERING In the matter of housing the car Mr. Robinson has again been unconventional. The ordinary shovel is covered in like a box car, which looks well when new, but does not stand the test of service and is not fire-proof. In this shovel everything is covered that needs to be covered and the rest is left off. No woodwork whatever is employed.

The boiler is covered with magnesia blocks and heavy sheet steel, painted. All the machinery is weather-proof. A commodious steel cab is provided for the fireman, containing feed pump and injector, also lockers for tools; and another for the engineer or runner.

For situations in which it is desirable to enclose the entire machine, a steel cab is furnished covering the entire car, at a slight additional cost.

TRANSPORTATION As already described, the back-guys are adjustable so that the A-frame can be lowered to within the height limit of 15 feet above rail. This is done by the power of the shovel itself



Atlantic Steam Shovel, Built For The United States Reclamation Service.
Ready For Transportation.

ATLANTIC EQUIPMENT COMPANY

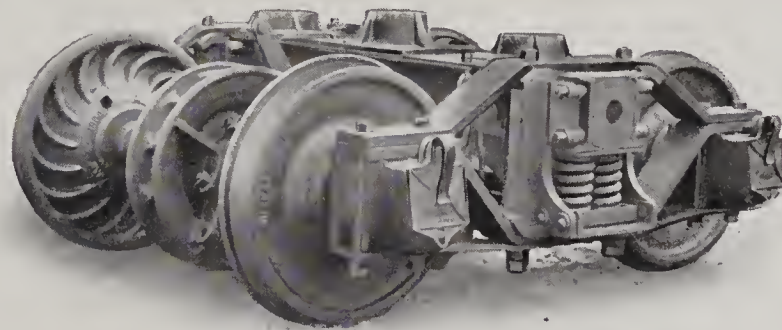
by means of block and tackle worked from the swinging engines. For transportation to considerable distance the boom and dipper handle are loaded on a flat car, as is usual, and they are readily disconnected for this purpose.

DRAFT RIGGING The shovel is fitted at both front and rear ends with standard automatic steel couplers of approved make.

TRUCKS The shovel is mounted on two all-steel trucks of diamond pattern especially designed for the purpose and having a large excess of strength over the requirements.

The axles are of best hammered steel with M. C. B. standard axle boxes. The bolster is formed of a steel box girder composed of two steel I-beams with steel plate top and bottom. The main arch bars are 6 inches wide. The rear truck is fitted with hand brakes.

COAL AND WATER SUPPLY This is amply provided for by water tanks of large capacity and a coal platform attached to and projecting from the rear of the shovel. This coal platform is built entirely of steel and is hinged in such a way that it folds up against the rear of the machine when not in use.



Atlantic Steam Shovel Truck.

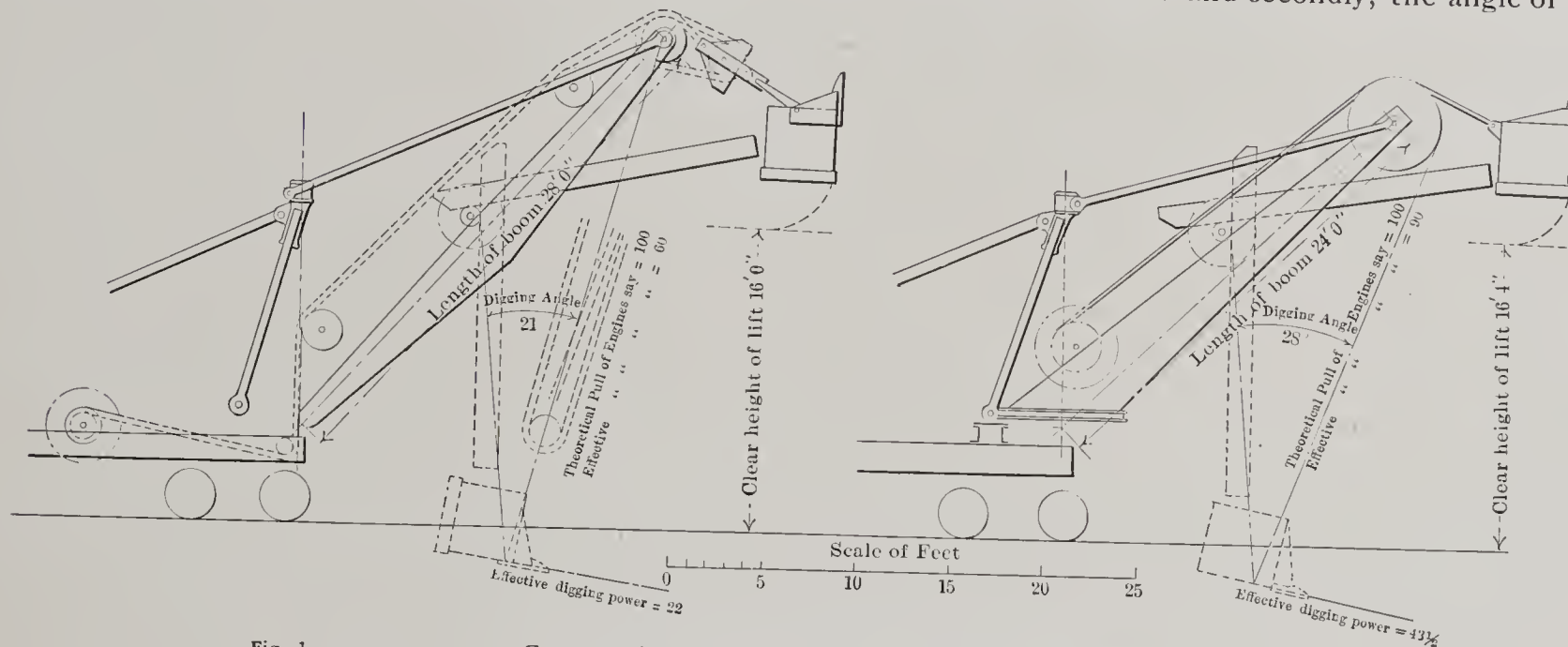


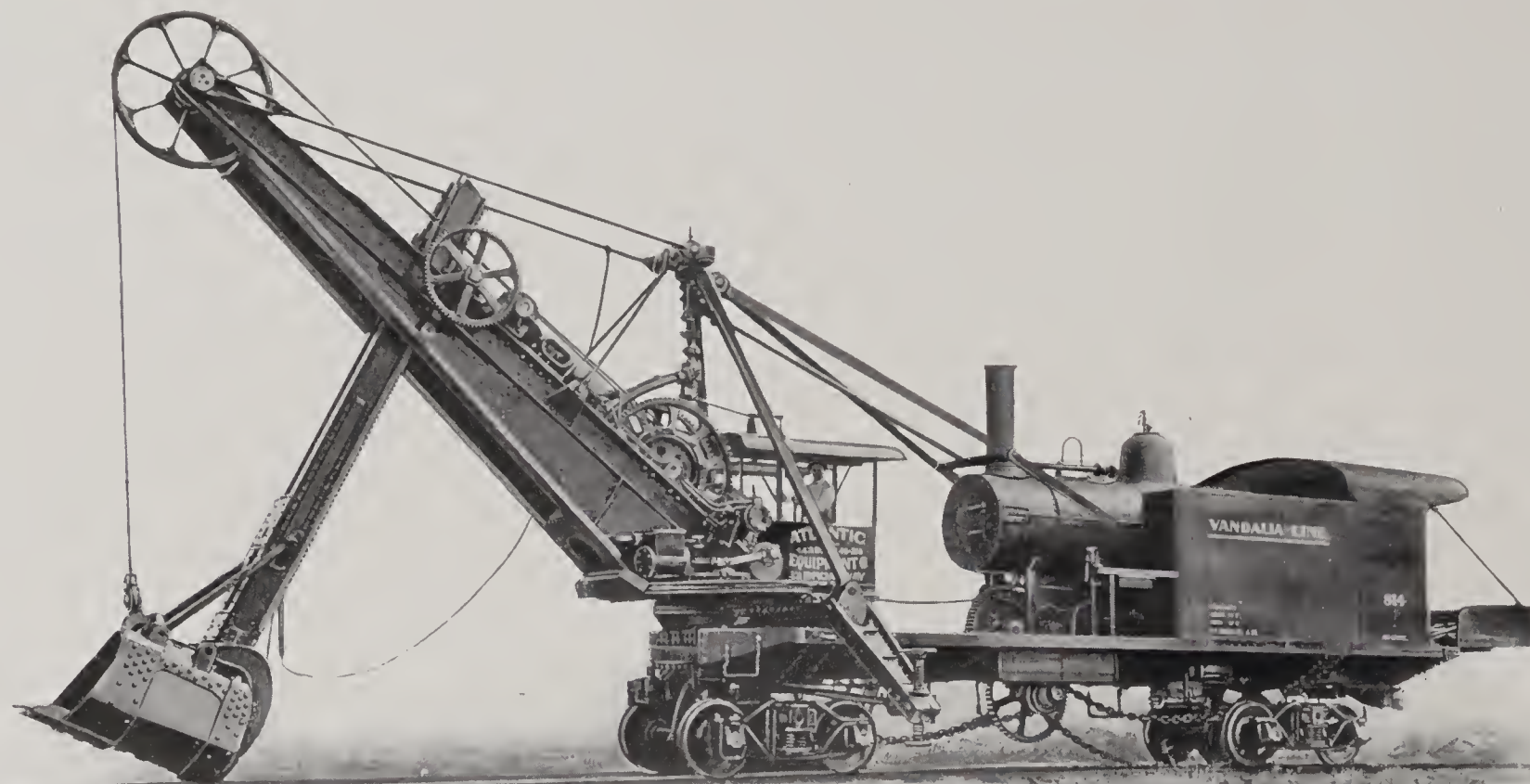
Atlantic Steam Shovel, Built For The Lantry-Sharp Contracting Company.
Now At Work On The Atchison, Topeka And Santa Fe Railway Near Belen, New Mexico.

ATLANTIC EQUIPMENT COMPANY

Comparative Efficiency

The measure of efficiency of a shovel is the digging power produced at the teeth of the bucket relatively to the theoretical pull due to the pressure of the steam in the engine cylinders. The two principal factors which determine this are : First, the loss by friction in the mechanism of transmission : and secondly, the angle of lead





Atlantic Steam Shovel, Built For The Vandalia Line.
Now At Work Near Indianapolis, Indiana.

ATLANTIC EQUIPMENT COMPANY

when the dipper is in effective working position. The internal friction of the engine in this shovel is the same as in any shovel, but a great reduction in loss by friction is effected by exerting a direct pull with wire rope around a single sheave of large diameter as compared with an indirect pull of chain around a small drum and from 5 to 7 sheaves of small diameter. This friction amounts to about 40 per cent. in the chain hoist and 10 per cent. in the wire rope hoist. In a shovel working at four dipper loads per minute and a hoisting chain passing over six sheaves, each link of the chain makes two bends every time it passes a sheave; once going on and once coming off. This is equal to 12 bends per lift hoisting, and 12 bends in lowering, or 96 bends per minute. If there be—say—300 links in the chain passing these sheaves this is equal to nearly 30,000 bendings (or slidings) per minute of one link on another, without counting the bends going on the drum. This accounts for the great friction and wear that takes place in hoisting chain. The wire rope, on the other hand, with single sheave, makes two bends hoisting and two bends lowering four times per minute, equal to 16 bends per minute. These bends occur over a sheave of very large size which do not overstrain the wires of the rope or cause appreciable wear. The effective pull upon the dipper is therefore practically the same as the effective pull at the engines after deducting internal friction of the engines.

The second important factor is the digging angle. In figure 1, the digging angle of the ordinary construction with chain hoist is shown, and in figure 2 the digging angle of the wire rope shovel with wire rope hoist is shown; from which it will be seen that a great increase in digging power at the teeth of the bucket is obtained with the same initial pull in each case. This means that strains upon the dipper handle and boom are much reduced and the thrusting power required is less, while the shovel performs hard work with greater ease and less effort. Added to this is the great advantage of increased height of lift being obtained with a boom of shorter length. The boom of the wire rope shovel is from 4 feet to 6 feet shorter for the same lift than in the chain



Atlantic Steam Shovel, Built For W. J. Oliver.
At Work On The Southern Railway Near Lynchburg, Virginia.

ATLANTIC EQUIPMENT COMPANY

construction, or, on the other hand, a proportionately higher lift can be obtained with the same length of boom.

Taking the improved efficiency of the wire rope and the improved digging angle together, the result shows that this shovel is from 65 per cent. to 85 per cent. more efficient than the best modern chain hoist shovels.

Assuming the theoretical pull of the engines in each case to be alike, calling it 100, than deducting the 10 per cent. loss by transmission in the wire rope shovel the pull on the bucket will be 90, and in the chain shovel deducting 40 per cent. for chain friction, it will be 60. Resolving these in each case gives digging thrust and dipper-arm thrusts as follows (assuming vertical position of dipper handle in each case):

	Pull of Engines.	Pull on Dipper.	Dipper-Arm Thrust.	Digging Power.
Chain Shovel	100	60	57	22
Wire Rope Shovel	100	90	81	43½

This means that on the above basis the Robinson shovel exerts 40 per cent. of the theoretical engine power at the teeth of the bucket, while a chain shovel with the above angle exerts only 21½ per cent. It is therefore nearly twice as efficient.



Atlantic Steam Shovel.

Reducing Grades On The Richmond, Fredericksburg & Potomac Railroad.

ATLANTIC EQUIPMENT COMPANY

Grade Reduction

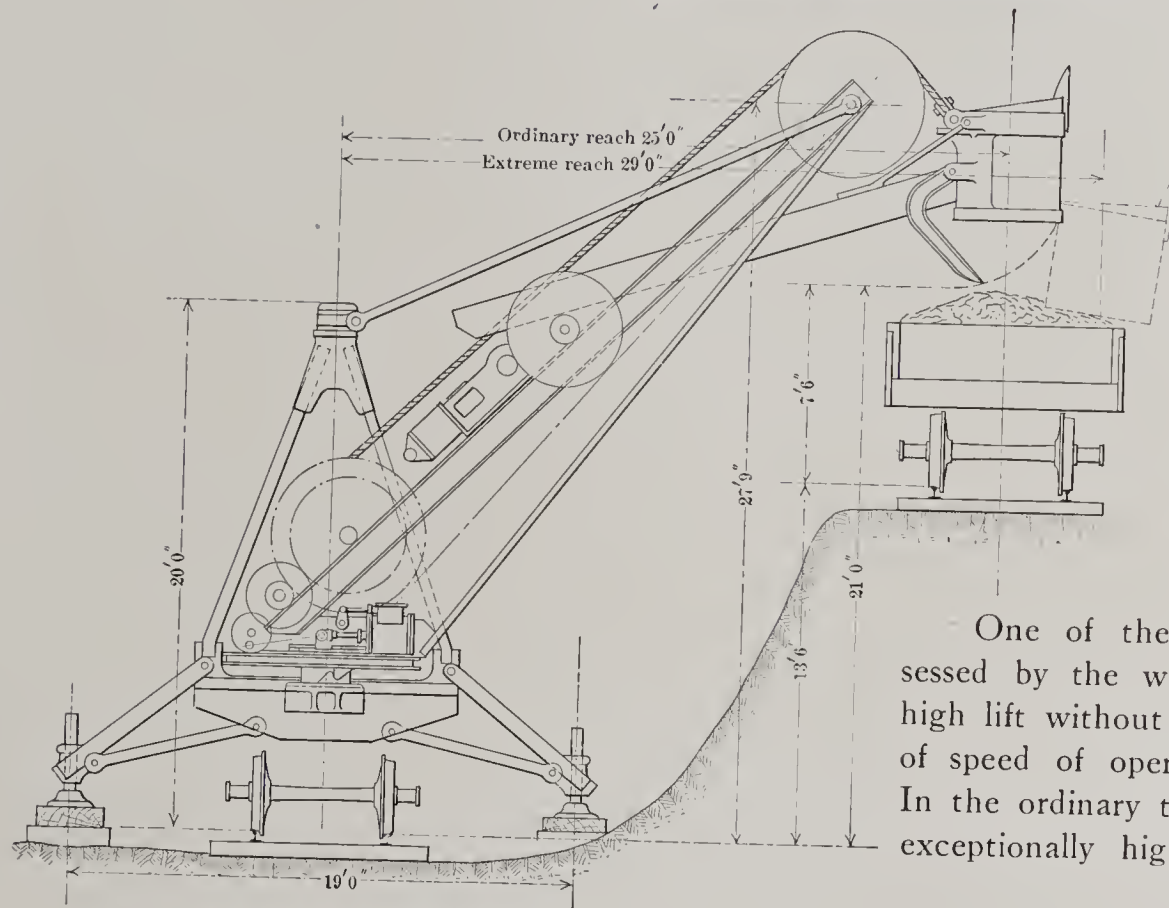
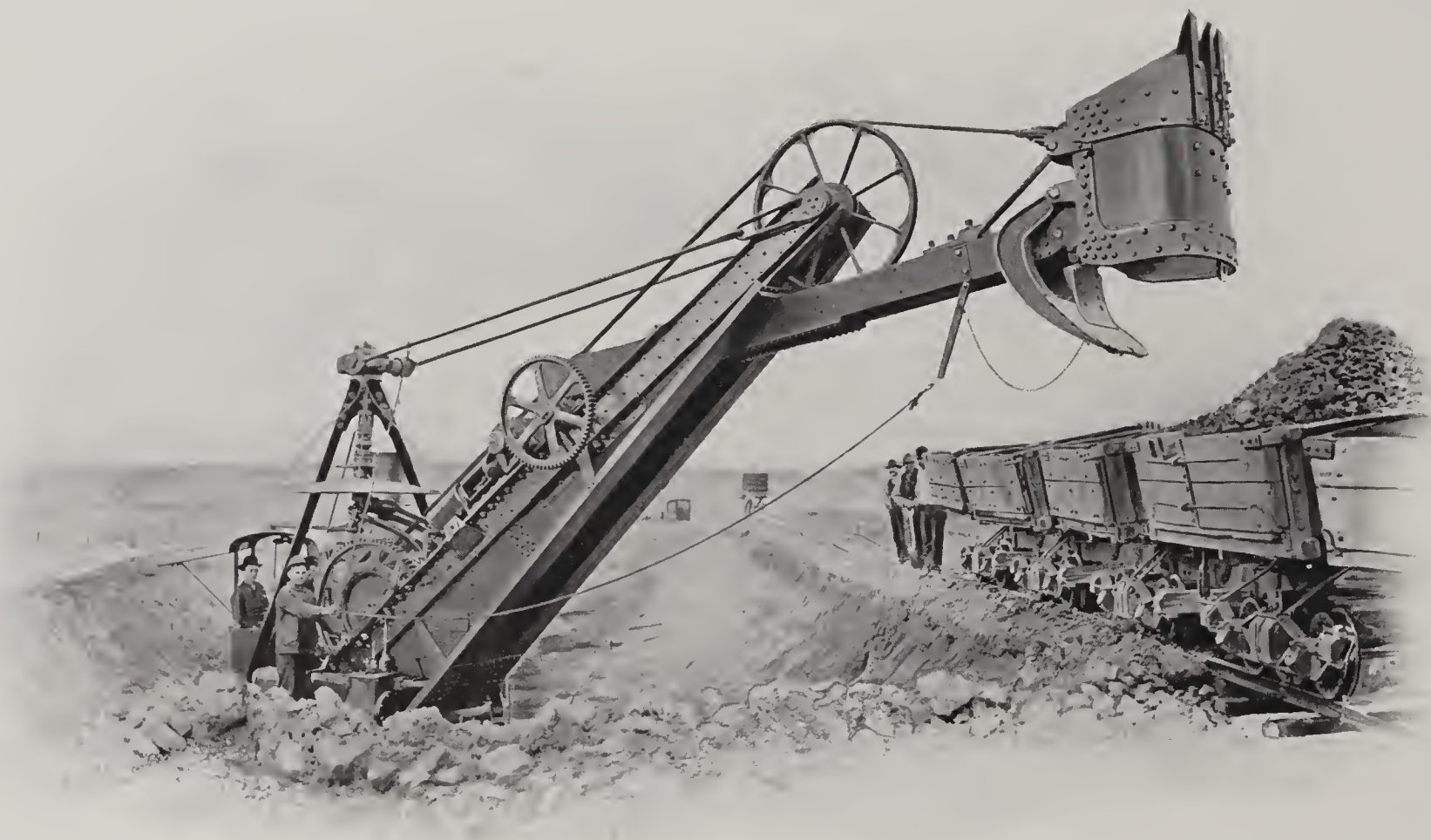


Fig. 0.

It is unnecessary to point out to railroad men the advantages of easy grades for the economical haulage of heavy loads. The reduction of grades is now recognized to be such an important factor in the economy of railroading that enormous sums of money are being expended in this direction. It is safe to say that with this improved shovel, this class of work can be more readily, efficiently and economically done than ever before.

One of the most important advantages possessed by the wire rope shovel is its capacity for high lift without sacrificing the essential conditions of speed of operation and efficient digging power. In the ordinary type of shovel when built with an exceptionally high lift the angle of lead becomes

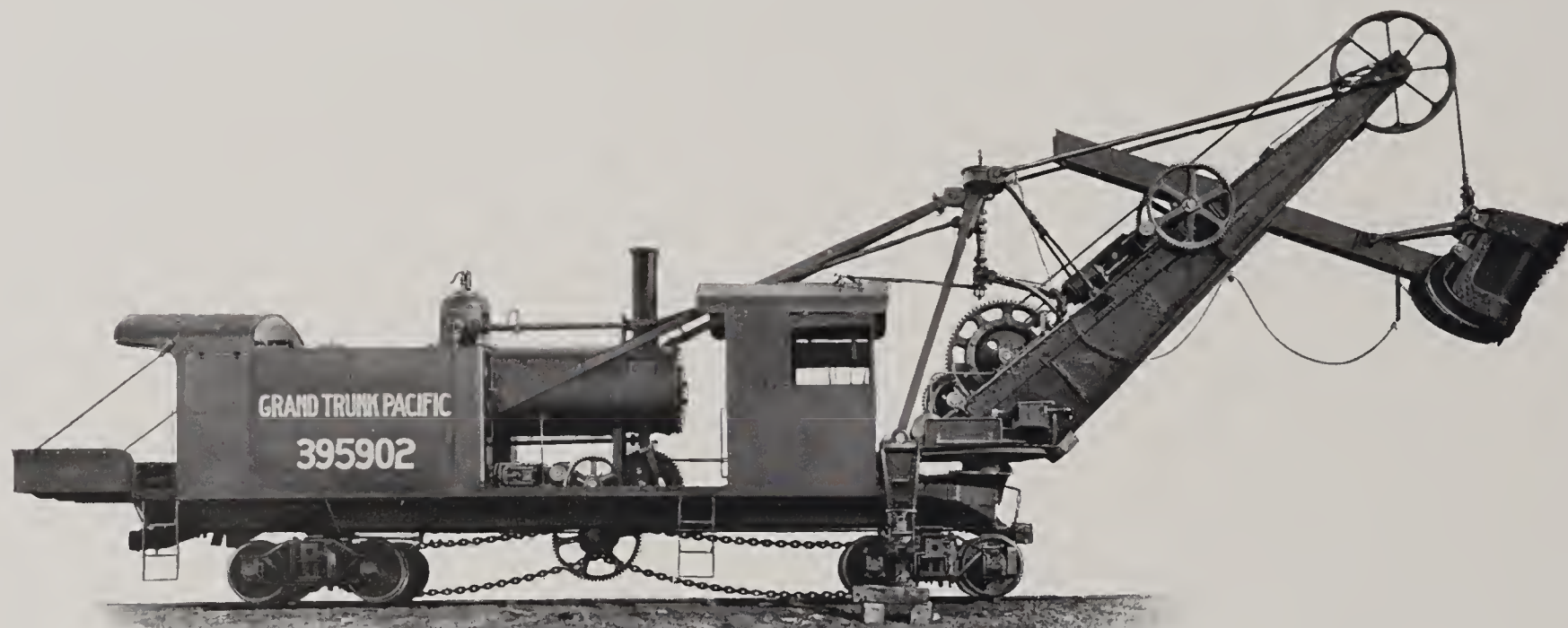


Atlantic Steam Shovel.
Excavating On The Southern Railway.

ATLANTIC EQUIPMENT COMPANY

so acute that it interferes greatly with the digging power of the machine, and the length and weight of the boom becomes so great as to occasion serious strains and make the machine slow in its movements. Furthermore, the length and weight of the hoisting chain is greatly increased. In the Atlantic shovel, however, these difficulties are not found and the large single sheave at point of boom accomplishes the triple purpose of shortening the boom, increasing the angle of lead and increasing the height to which the dipper can be lifted. In Fig. O is illustrated our class 60-20-3½ shovel, which is a very powerful machine especially adapted for grade reduction. The extreme height of lift in this machine is 21 feet. With an allowance of 7 feet for the total space occupied by the receiving car and its load we have a difference of level between the track on which the shovel stands and the car track of 14 feet. In this shovel the length of boom is no greater than in other shovels for a much lower lift, and the digging angle and speed of movement is fully maintained up to an efficient point. For special cases we can build shovels with 24 feet or more height of lift, but these extreme heights are obtained at some sacrifice of efficiency of digging.

Owing to the speed of movement of these machines they can maintain their regular rate of work when working at high lift, and sufficient margin can be allowed to enable them to reach the car easily without having to pull the dipper up to the last available inch.



Atlantic Steam Shovel, Built For The Grand Trunk Pacific Railway.
Nine Of These Shovels Are Now In Service On This Road.

ATLANTIC EQUIPMENT COMPANY

Abstract Specifications

Class	*25-11-1¼	35-15-1¾	44-16-2½	60-17-3½	80-18-4½
Pull of engines	25,000 lbs.	35,000 lbs.	44,000 lbs.	60,000 lbs.	80,000 lbs.
Clear height of lift	11 ft.	15 ft.	16 ft.	17 ft.	18 ft.
Capacity of dipper	1¼ cu. yds.	1½ to 2 cu. yds.	2½ to 3 cu. yds.	3½ to 4 cu. yds.	4 to 5 cu. yds.
Length of car	24 ft.	34 ft.	36 ft.	38 ft.	42 ft.
Size of steel beams of car sills	12 in.	15 in.	20 in. 65 lbs.	20 in. 80 lbs.	20 in. 100 lbs.
Width of car	7 ft.	9 ft. 8 in.	10 ft.	10 ft.	10 ft.
Length of boom	18 ft. 6 in.	23 ft.	23 ft. 8 in.	25 ft. 10 in.	28 ft. 9 in.
Number of sheaves	1	1	1	1	1
Diameter of sheave at point of boom	3 ft. 6 in.	4 ft. 9 in.	5 ft.	5 ft. 6 in.	6 ft. 0 in.
Size of hoisting engines	7½ in. x 8 in.	9 in. x 9 in.	10 in. x 10 in.	11 in. x 11 in.	12 in. x 12 in.
Size of swinging engines	5 in. x 6 in.	7 in. x 7 in.	7 in. x 8 in.	8 in. x 8 in.	8 in. x 8 in.
Size of thrusting engines	5 in. x 6 in.	7 in. x 7 in.	7 in. x 8 in.	8 in. x 8 in.	9 in. x 9 in.
Size of car wheels	†54 in. Forward †46 in. Rear	33 in.	33 in.	33 in.	33 in.
Size of journals	‡6 in. x 12 in.	4¼ in. x 8 in.	5 in. x 9 in.	5 in. x 9 in.	5½ in. x 10 in.
Diameter of boiler	54 in.	44 in.	46 in.	48 in.	52 in.
Length of boiler	‡8 ft. 3 in.	19 ft.	20 ft.	21 ft.	22 ft.

* Class 25-11-1¼ is built for broad tread traction wheels for contractors' use or for railroad trucks. Boom swings 41° back of right angle to car body or through a total arc of 262°.

† Traction wheels.

‡ Front journals for traction wheels.

§ Vertical, height.



Atlantic Steam Shovel, Built For The St. Louis & San Francisco Railroad.
At Work Near Birmingham, Alabama.



Atlantic Steam Shovel, Built For The Atlas Portland Cement Company.
At Work In Cement Quarry.



Atlantic Steam Shovel, Built For Winston & Company.
At Work On The Deepwater Railway Near Kegley, West Virginia.



Atlantic Steam Shovel, Built For D. A. Langhorne Company.
Being Moved Across Country For Work On The Tidewater Railway Near Roanoke, Virginia.

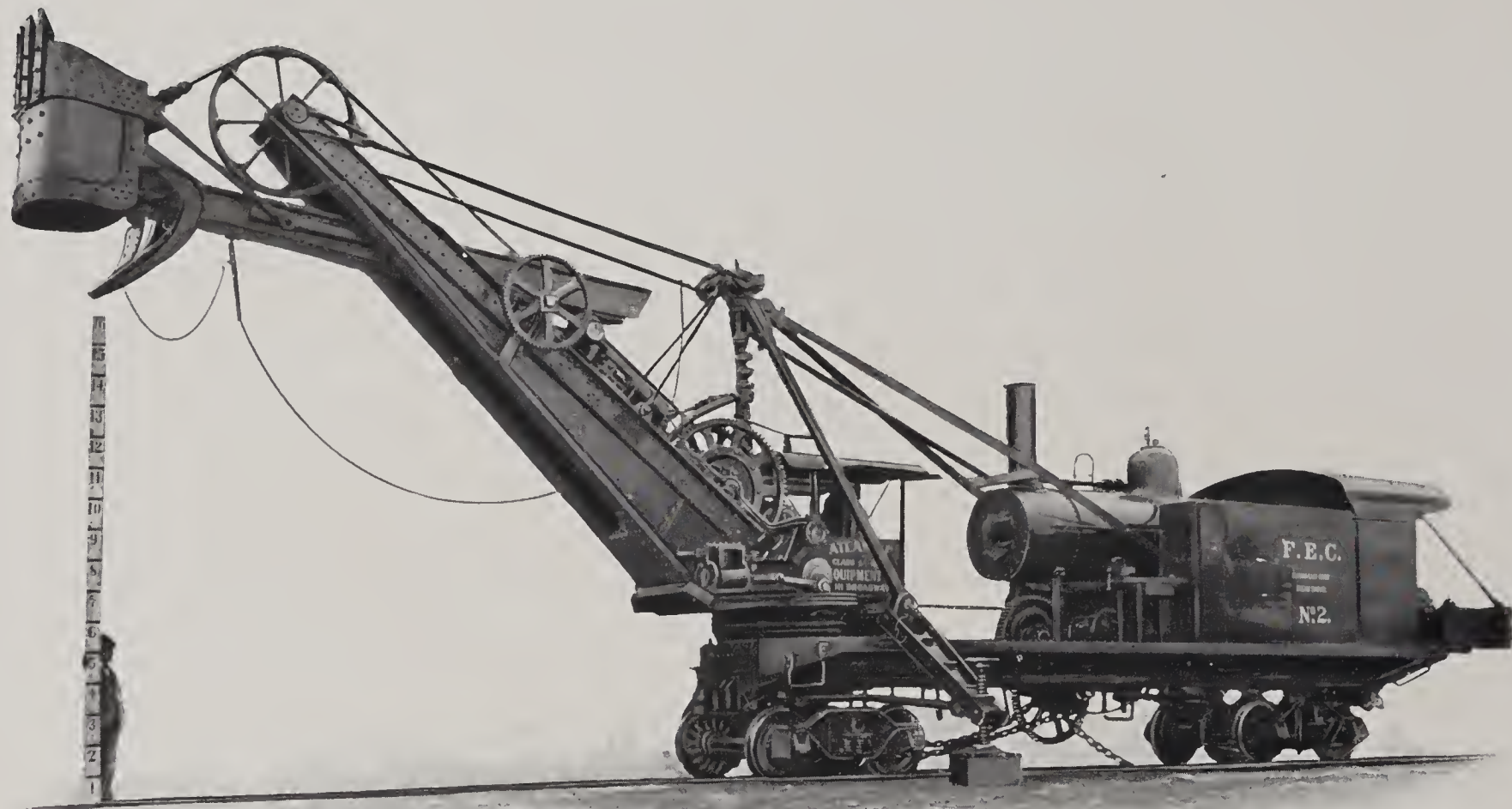
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Atlantic Steam Shovel, Built For Winston & Company.
Loading Blasted Rock On The Deepwater Railway Near Kegley, West Virginia.



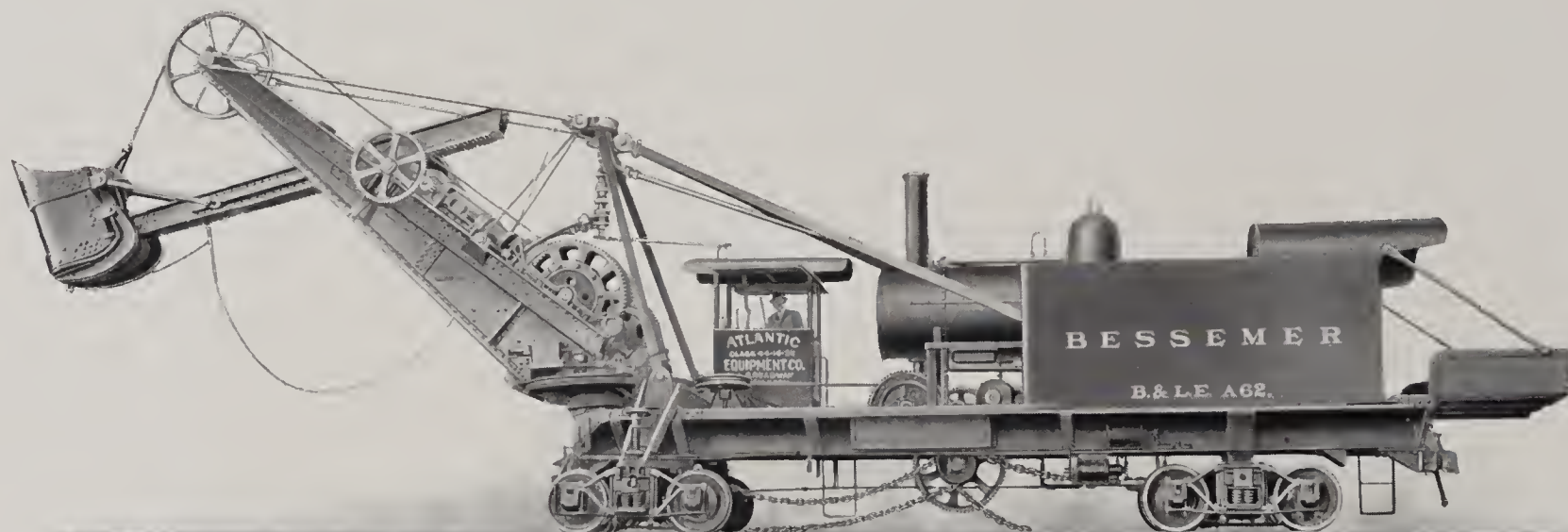
Atlantic Steam Shovel, Built For The MacArthur Brothers Company.
At Work In Loose Rock On The Tidewater Railway Near Roanoke, Virginia.



Atlantic Steam Shovel, Built For The Florida East Coast Railway.
Now At Work At Miami, Florida.



Atlantic Steam Shovel, Built For The MacArthur Brothers Company.
Working In Rock Bank.



Atlantic Steam Shovel, Built For The Bessemer & Lake Erie Railroad.
Now At Work At Greenville, Pennsylvania.



Atlantic Steam Shovel, Built For Aktiebolaget Järnvägsmateriel, Sweden.
At Work On The Orsa-Sveg Railway, Sweden.



Eight Yard Dipper Dredge, Built For The Cuban Government.

Light Locomotives
10030



BUILT BY
American Locomotive Company

[The Code Word for this Pamphlet is "CALEBIT"]

91

AMERICAN LOCOMOTIVE COMPANY

30 CHURCH STREET, NEW YORK CITY

CABLE ADDRESS "LOCOMOTIVE NEWYORK"

6

SCHENECTADY WORKS — Schenectady, N. Y.

BROOKS WORKS — Dunkirk, N. Y.

RICHMOND WORKS — Richmond, Va.

ROGERS WORKS — Paterson, N. J.

PITTSBURG WORKS — Allegheny, Pa.

COOKE WORKS — Paterson, N. J.

RHODE ISLAND WORKS — Providence, R. I.

DICKSON WORKS — Scranton, Pa.

MANCHESTER WORKS — Manchester, N. H.

MONTREAL WORKS — Montreal, Canada

Light Locomotives



HIS catalogue illustrates and describes small locomotives for special classes of service for which the ordinary road or yard engine is unsuitable.

A number of different types are presented, adapted for the use of contractors, mines, logging roads, plantations and industrial plants of all kinds and for a wide range of service where the existing conditions include light rails, uneven road bed or limited clearances.

The principal dimensions and data given in each instance are intended as a guide in determining the type and size of locomotive required.

The weight, diameter of driving-wheels, boiler pressure, tank capacity, smoke stack, style of cab, grates, or any other features of the designs illustrated may be modified to meet special requirements or purchaser's preferences.

AMERICAN LOCOMOTIVE COMPANY



FOUR WHEEL TANK LOCOMOTIVE
FOR CONTRACTORS, QUARRY, MINE AND INDUSTRIAL SERVICE

AMERICAN LOCOMOTIVE COMPANY

Four Wheel Tank Locomotives

O-4-O-T-TYPE

CODE WORD	Gauge of Track	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Wheel Base	Capac- ity of Water Tank	Weight in Working Order	Boiler Pres- sure	Tract- ive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
	Feet and Inches	Inches	Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
												½%	1%	1½%	2%	2½%	3%
Allocation	2-0 to 4-8½	6x10	24	3-6	150	13,000	150	1,915	16	20	285	105	65	45	35	25	20
Alloccato	2-0 to 4-8½	6x12	24	3-6	150	13,500	150	2,295	16	20	345	130	80	55	45	35	25
Alloccavi	2-0 to 4-8½	7x10	24	3-9	200	16,000	150	2,600	20	25	395	150	90	65	50	40	30
Alloccone	2-0 to 4-8½	7x12	24	3-9	200	16,500	150	3,125	20	25	470	180	110	75	60	50	40
Allocere	2-0 to 4-8½	8x12	26	4-0	250	20,000	150	3,760	20	30	565	215	130	90	70	55	45
Allochezie	2-0 to 4-8½	8x14	26	4-0	300	21,000	150	4,395	25	30	665	255	150	110	85	65	55
Allochroe	3-0 to 4-8½	9x14	29	4-6	325	24,000	150	4,960	25	35	750	285	175	120	95	75	65
Alloclase	3-0 to 4-8½	10x14	29	4-6	500	30,000	150	6,150	30	35	935	360	215	155	115	95	75
Allocroite	3-0 to 4-8½	10x16	30	5-0	600	36,000	150	6,800	35	40	1,025	390	240	170	130	100	85
Allocrosia	3-0 to 4-8½	11x16	33	5-0	700	37,600	150	7,510	35	40	1,135	435	265	185	140	115	95
Allocutae	3-0 to 4-8½	12x16	36	5-3	825	42,000	160	8,700	40	45	1,315	505	305	215	165	135	110
Allocutiva	3-0 to 4-8½	12x18	36	5-3	900	45,000	160	9,790	40	45	1,480	570	345	245	185	150	125
Allocutore	3-0 to 4-8½	13x18	36	6-3	950	52,000	160	11,490	45	50	1,740	665	405	290	220	175	145
Allocutum	4-8½	14x20	44	7-0	1,075	62,000	160	12,115	50	55	1,835	705	425	300	230	185	150
Allocuturi	4-8½	14x22	44	7-0	1,075	63,000	160	13,330	50	55	2,015	770	470	335	255	205	170

The above figures for Hauling Capacity are based on a frictional resistance of 6½ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

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AMERICAN LOCOMOTIVE COMPANY



FOUR WHEEL TANK LOCOMOTIVE
FOR CONTRACTORS, STEEL WORKS, BLAST FURNACE AND INDUSTRIAL SERVICE

AMERICAN LOCOMOTIVE COMPANY

Four Wheel Tank Locomotives

O-4-O-T-TYPE

CODE WORD	Gauge of Track	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Wheel Base	Capac- ity of Water Tank	Weight in Working Order	Boiler Pres- sure	Tract- ive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
	Feet and Inches	Inches	Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
												½%	1%	1½%	2%	2½%	3%
Allodape	2-0 to 4-8½	6x10	24	3-6	150	13,000	150	1,915	16	20	285	105	65	45	35	25	20
Allodiale	2-0 to 4-8½	6x12	24	3-6	150	13,500	150	2,295	16	20	345	130	80	55	45	35	25
Allodially	2-0 to 4-8½	7x10	24	3-9	200	16,000	150	2,600	20	25	395	150	90	65	50	40	30
Allodium	2-0 to 4-8½	7x12	24	3-9	200	16,500	150	3,125	20	25	470	180	110	75	60	50	40
Allodola	2-0 to 4-8½	8x12	26	4-0	250	20,000	150	3,760	20	30	565	215	130	90	70	55	45
Allodrome	2-0 to 4-8½	8x14	26	4-0	300	21,000	150	4,395	25	30	665	255	150	110	85	65	55
Allofana	3-0 to 4-8½	9x14	29	4-6	325	24,000	150	4,960	25	35	750	285	175	120	95	75	65
Allofillo	3-0 to 4-8½	10x14	29	4-6	500	30,000	150	6,150	30	35	935	360	215	155	115	95	75
Allogato	3-0 to 4-8½	10x16	30	5-0	600	36,000	150	6,800	35	40	1,025	390	240	170	130	100	85
Allogatore	3-0 to 4-8½	11x16	33	5-0	700	37,600	150	7,510	35	40	1,135	435	265	185	140	115	95
Alloggeria	3-0 to 4-8½	12x16	36	5-3	825	42,000	160	8,700	40	45	1,315	505	305	215	165	135	110
Alloggia	3-0 to 4-8½	12x18	36	5-3	900	45,000	160	9,790	40	45	1,480	570	345	245	185	150	125
Alloggiavi	3-0 to 4-8½	13x18	36	6-3	950	52,000	160	11,490	45	50	1,740	665	405	290	220	175	145
Allogliato	4-8½	14x20	44	7-0	1,075	62,000	160	12,115	50	55	1,835	705	425	300	230	185	150
Allograph	4-8½	14x22	44	7-0	1,075	63,000	160	13,330	50	55	2,015	770	470	335	255	205	170

The above figures for Hauling Capacity are based on a frictional resistance of 6½ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

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AMERICAN LOCOMOTIVE COMPANY



FOUR WHEEL TANK LOCOMOTIVE
FOR CONTRACTORS, PLANTATION, MINE AND INDUSTRIAL SERVICE
BUILT FOR GAUGES LESS THAN 24 INCHES

AMERICAN LOCOMOTIVE COMPANY

Four Wheel Tank Locomotives

O-4-O-T-TYPE

WEIGHTS AND HAULING CAPACITIES BASED ON 150 POUNDS BOILER PRESSURE

CODE WORD	Diam. and Stroke of Cylinder Inches	Diam. of Driving Wheels Inches	Wheel Base Feet and Inches	Capacity of Water Tank Gallons	Weight in Working Order Pounds	Tractive Power Pounds	Weight of Lightest Rail Advised Per Yard	Radius of Sharp- est Curve Advised Feet	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
									ON LEVEL	ON GRADES OF					
										1/2%	1%	1 1/2%	2%	2 1/2%	3%
Alloite	5 1/2 x 8	22	3-6	100	11,500	1,680	16	20	255	95	55	40	30	20	15
Allolalia	6 x 10	24	3-6	150	13,000	1,915	16	20	285	105	65	45	35	25	20
Allombardo	6 x 12	24	3-6	150	13,500	2,295	16	20	345	130	80	55	40	35	25
Allomorfia	7 x 10	24	3-9	200	16,000	2,600	20	25	395	150	90	65	50	40	30
Allomorthe	7 x 12	24	3-9	200	16,500	3,125	20	25	470	180	110	75	60	50	40
Allongeais	8 x 12	26	4-0	250	20,000	3,760	20	30	565	215	130	90	70	55	45
Allongean	8 x 14	26	4-0	300	21,000	4,395	25	30	665	255	150	110	85	65	55
Allongeon	9 x 14	29	4-6	325	24,000	4,960	25	35	750	285	175	120	95	75	65
Allongeras	10 x 14	29	4-6	500	30,000	6,150	30	35	935	360	215	155	115	95	75
Allonges	10 x 16	30	5-0	600	36,000	6,800	35	40	1,025	390	240	170	130	100	85

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

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AMERICAN LOCOMOTIVE COMPANY



FOUR WHEEL TANK LOCOMOTIVE
FOR CONTRACTORS, QUARRY, MINE AND INDUSTRIAL SERVICE

AMERICAN LOCOMOTIVE COMPANY

Four Wheel Tank Locomotives

O-4-O-T-TYPE

CODE WORD	Gauge of Track	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Wheel Base	Capac- ity of Water Tank	Weight in Working Order	Boiler Pres- sure	Tract- ive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
	Feet and Inches	Inches	Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
												½%	1%	1½%	2%	2½%	3%
Allonging	2-0 to 4-8½	6x10	24	3-6	150	13,000	150	1,915	16	20	285	105	65	45	35	25	20
Allonymo	2-0 to 4-8½	6x12	24	3-6	150	13,500	150	2,295	16	20	345	130	80	55	40	35	25
Allopathic	2-0 to 4-8½	7x10	24	3-9	200	16,000	150	2,600	20	25	395	150	90	65	50	40	30
Allopathy	2-0 to 4-8½	7x12	24	3-9	200	16,500	150	3,125	20	25	470	180	110	75	60	50	40
Allopatia	2-0 to 4-8½	8x12	26	4-0	250	20,000	150	3,760	20	30	565	215	130	90	70	55	45
Allopatico	2-0 to 4-8½	8x14	26	4-0	300	21,000	150	4,395	25	30	665	255	150	110	85	65	55
Allophane	3-0 to 4-8½	9x14	29	4-6	325	24,000	150	4,960	25	35	750	285	175	120	95	75	65
Allophyllae	3-0 to 4-8½	10x14	29	4-6	500	30,000	150	6,150	30	35	935	360	215	155	115	95	75
Allophylos	3-0 to 4-8½	10x16	30	5-0	600	36,000	150	6,800	35	40	1,025	390	240	170	130	100	85
Allophylum	3-0 to 4-8½	11x16	33	5-0	700	37,600	150	7,510	35	40	1,135	435	265	185	140	115	95
Alloplete	3-0 to 4-8½	12x16	36	5-3	825	42,000	160	8,700	40	45	1,315	505	305	215	165	135	110
Allopore	3-0 to 4-8½	12x18	36	5-3	900	45,000	160	9,790	40	45	1,480	570	345	245	185	150	125
Alloporin	3-0 to 4-8½	13x18	36	6-3	950	52,000	160	11,490	45	50	1,740	665	405	290	220	175	145
Alloppiano	4-8½	14x20	44	7-0	1,075	62,000	160	12,115	50	55	1,835	705	425	300	230	185	150
Alloppiava	4-8½	14x22	44	7-0	1,075	63,000	160	13,330	50	55	2,015	770	470	335	255	205	170

The above figures for Hauling Capacity are based on a frictional resistance of 6½ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

AMERICAN LOCOMOTIVE COMPANY



FOUR WHEEL TANK LOCOMOTIVE

FOR CONTRACTORS, STEEL MILL, BLAST FURNACE AND INDUSTRIAL SERVICE

AMERICAN LOCOMOTIVE COMPANY

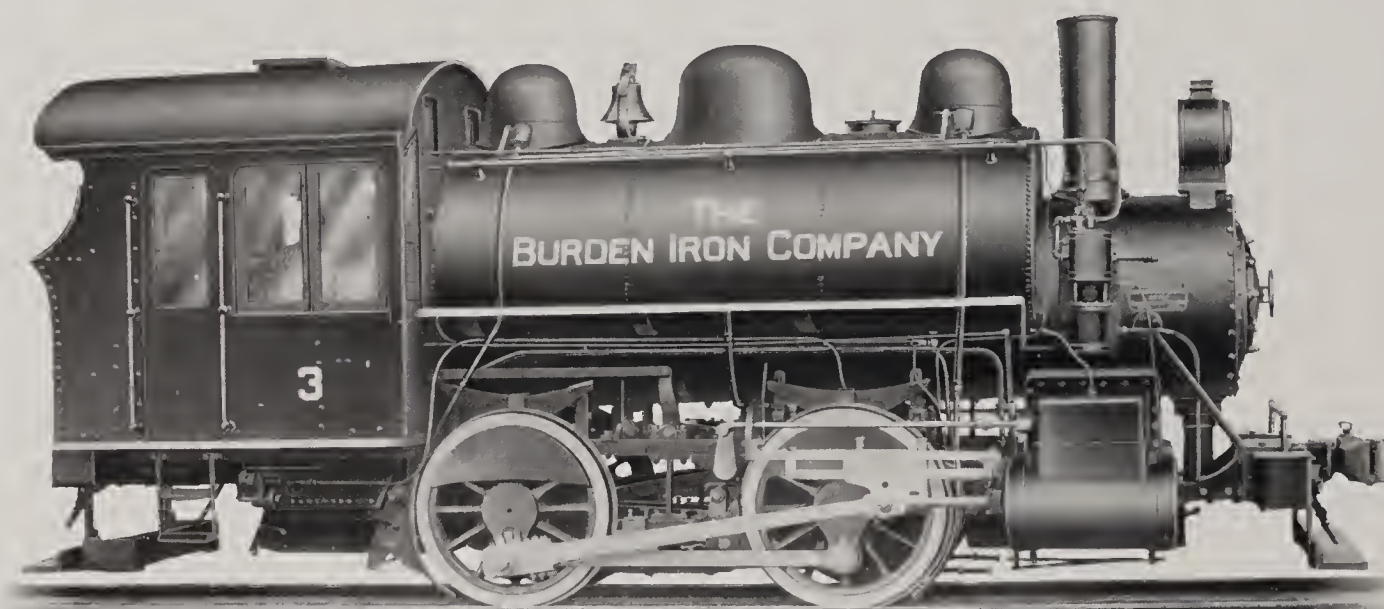
Four Wheel Tank Locomotives

O-4-O-T-TYPE

CODE WORD	Gauge of Track	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Wheel Base	Capac- ity of Water Tank	Weight in Working Order	Boiler Pres- sure	Tract- ive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
	Feet and Inches	Inches	Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
												½%	1%	1½%	2%	2½%	3%
Alloppichi	3-0 to 4-8½	9x14	29	4-6	325	24,000	150	4,960	25	35	750	285	175	120	95	75	65
Alloppico	3-0 to 4-8½	10x14	29	4-6	500	30,000	150	6,150	30	35	935	360	215	155	115	95	75
Alloptere	3-0 to 4-8½	10x16	30	5-0	600	36,000	150	6,800	35	40	1,025	390	240	170	130	100	85
Alloquampur	3-0 to 4-8½	11x16	33	5-0	700	37,600	150	7,510	35	40	1,135	435	265	185	140	115	95
Alloquebar	3-0 to 4-8½	12x16	36	5-3	825	42,000	160	8,700	40	45	1,315	505	305	215	165	135	110
Alloqueris	3-0 to 4-8½	12x18	36	5-3	900	45,000	160	9,790	40	45	1,480	570	345	245	185	150	125
Alloques	3-0 to 4-8½	13x18	36	6-3	950	52,000	160	11,490	45	50	1,740	665	405	290	220	175	145
Alloquium	4-8½	14x20	44	7-0	1,075	62,000	160	12,115	50	55	1,835	705	425	300	230	185	150
Alloquor	4-8½	14x22	44	7-0	1,075	63,000	160	13,330	55	55	2,015	770	470	335	255	205	170
Allora	4-8½	14x24	44	7-0	1,125	69,000	160	14,550	60	55	2,205	850	515	360	280	225	185
Alloriaba	4-8½	15x24	44	7-0	1,125	75,000	160	16,700	65	55	2,530	975	590	420	320	260	210
Alloriamos	4-8½	16x24	46	7-0	1,200	85,000	160	18,170	75	55	2,750	1,055	640	450	345	275	225
Alloriando	4-8½	17x24	48	7-6	1,500	100,000	170	20,800	85	55	3,150	1,215	740	520	400	320	265
Alloriare	4-8½	18x24	48	7-6	2,000	114,000	170	23,400	95	60	3,545	1,365	830	585	450	360	295

The above figures for Hauling Capacity are based on a frictional resistance of 6½ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

AMERICAN LOCOMOTIVE COMPANY



FOUR WHEEL TANK LOCOMOTIVE
FOR CONTRACTORS, MINE AND INDUSTRIAL SERVICE

AMERICAN LOCOMOTIVE COMPANY

Four Wheel Tank Locomotives

O-4-O-T-TYPE

CODE WORD	Gauge of Track	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Wheel Base	Capac- ity of Water Tank	Weight in Working Order	Boiler Pres- sure	Tract- ive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
	Feet and Inches	Inches	Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
												1½%	1%	1½%	2%	2½%	3%
Alloriaron	3-0 to 4-8½	9x14	29	4-6	325	24,000	150	4,960	25	35	750	285	175	120	95	75	65
Alloriasas	3-0 to 4-8½	10x14	29	4-6	500	30,000	150	6,150	30	35	935	360	215	155	115	95	75
Allorino	3-0 to 4-8½	10x16	30	5-0	600	36,000	150	6,800	35	40	1,025	390	240	170	130	100	85
Allosperme	3-0 to 4-8½	11x16	33	5-0	700	37,600	150	7,510	35	40	1,135	435	265	185	140	115	95
Allotment	3-0 to 4-8½	12x16	36	5-3	825	42,000	160	8,700	40	45	1,315	505	305	215	165	135	110
Allotrete	3-0 to 4-8½	12x18	36	5-3	900	45,000	160	9,790	45	45	1,480	570	345	245	185	150	125
Allotriges	3-0 to 4-8½	13x18	36	6-3	950	52,000	160	11,490	45	50	1,740	665	405	290	220	175	145
Allotropie	4-8½	14x20	44	7-0	1,075	62,000	160	12,115	50	55	1,835	705	425	300	230	185	150
Allottammo	4-8½	14x22	44	7-0	1,075	63,000	160	13,330	55	55	2,015	770	470	335	255	205	170
Allottando	4-8½	14x24	44	7-0	1,125	69,000	160	14,550	60	55	2,205	850	515	360	280	225	185
Allottassi	4-8½	15x24	44	7-0	1,125	75,000	160	16,700	65	55	2,530	975	590	420	320	260	210
Allottery	4-8½	16x24	46	7-0	1,200	85,000	160	18,170	75	55	2,750	1,055	640	450	345	275	225
Allouable	4-8½	17x24	48	7-6	1,500	100,000	170	20,800	85	55	3,150	1,215	740	520	400	320	265
Allouange	4-8½	18x24	48	7-6	2,000	114,000	170	23,400	95	60	3,545	1,365	830	585	450	360	295

The above figures for Hauling Capacity are based on a frictional resistance of 6½ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

AMERICAN LOCOMOTIVE COMPANY



SIX WHEEL TANK LOCOMOTIVE
FOR CONTRACTORS, MINE AND INDUSTRIAL SERVICE

AMERICAN LOCOMOTIVE COMPANY

Six Wheel Tank Locomotives

O-6-O-T-TYPE

CODE WORD	Gauge of Track	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Wheel Base	Capac- ity of Water Tank	Weight in Working Order	Boiler Pres- sure	Tract- ive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
	Feet and Inches	Inches	Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
												½%	1%	1½%	2%	2½%	3%
Allouant	2-6 to 4-8½	7x10	24	5-6	200	16,000	150	2,600	12	50	395	150	90	65	50	40	30
Allowed	2-6 to 4-8½	7x12	24	5-6	200	17,000	150	3,125	12	50	470	180	100	75	60	50	40
Allowedly	2-6 to 4-8½	8x12	26	5-6	300	22,000	150	3,760	16	55	565	215	130	90	70	55	45
Allowing	2-6 to 4-8½	8x14	26	5-6	300	22,500	150	4,395	16	55	665	255	150	110	85	65	55
Allowingly	2-6 to 4-8½	9x14	29	6-0	400	27,500	150	4,960	20	60	750	285	175	120	95	75	65
Alloxan	2-6 to 4-8½	10x14	29	6-0	500	32,000	150	6,150	25	60	935	360	215	155	115	95	75
Alloxanate	2-6 to 4-8½	10x16	30	7-0	650	37,000	150	6,800	25	80	1,025	390	240	170	130	100	85
Alloxantin	2-6 to 4-8½	11x16	33	8-0	800	42,000	150	7,510	30	90	1,135	435	265	185	140	115	95
Alloyage	2-6 to 4-8½	12x16	36	8-6	950	47,000	160	8,700	35	100	1,315	505	305	215	165	135	110
Alloyers	2-6 to 4-8½	12x18	36	8-6	950	48,000	160	9,790	35	100	1,480	570	345	245	185	150	125

The above figures for Hauling Capacity are based on a frictional resistance of 6½ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

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AMERICAN LOCOMOTIVE COMPANY



SIX WHEEL TANK LOCOMOTIVE
FOR CONTRACTORS, MINE AND INDUSTRIAL SERVICE

AMERICAN LOCOMOTIVE COMPANY

Six Wheel Tank Locomotives

O-6-O-T-TYPE

CODE WORD	Gauge of Track	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Wheel Base	Capac- ity of Water Tank	Weight in Working Order	Boiler Pres- sure	Tract- ive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
	Feet and Inches	Inches	Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
												1½%	1%	1½%	2%	2½%	3%
Alloys	2-6 to 4-8½	7x10	24	5-6	200	16,000	150	2,600	12	50	395	150	90	65	50	40	30
Allozares	2-6 to 4-8½	7x12	24	5-6	200	17,000	150	3,125	12	50	470	180	100	75	60	50	40
Allozos	2-6 to 4-8½	8x12	26	5-6	300	22,000	150	3,760	16	55	565	215	130	90	70	55	45
Allrunes	2-6 to 4-8½	8x14	26	5-6	300	22,500	150	4,395	16	55	665	255	150	110	85	65	55
Allseits	2-6 to 4-8½	9x14	29	6-0	400	27,500	150	4,960	20	60	750	285	175	120	95	75	65
Allselig	2-6 to 4-8½	10x14	29	6-0	500	32,000	150	6,150	25	60	935	360	215	155	115	95	75
Allsichtig	2-6 to 4-8½	10x16	30	7-0	650	37,000	150	6,800	25	80	1,025	390	240	170	130	100	85
Allston	2-6 to 4-8½	11x16	33	8-0	800	42,000	150	7,510	30	90	1,135	435	265	185	140	115	95
Alltaegig	2-6 to 4-8½	12x16	36	8-6	950	47,000	160	8,700	35	100	1,315	505	305	215	165	135	110
Alltagsehe	2-6 to 4-8½	12x18	36	8-6	950	48,000	160	9,790	35	100	1,480	570	345	245	185	150	125

The above figures for Hauling Capacity are based on a frictional resistance of 6½ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

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AMERICAN LOCOMOTIVE COMPANY



SIX WHEEL TANK LOCOMOTIVE
FOR CONTRACTORS, MINE AND INDUSTRIAL SERVICE

AMERICAN LOCOMOTIVE COMPANY

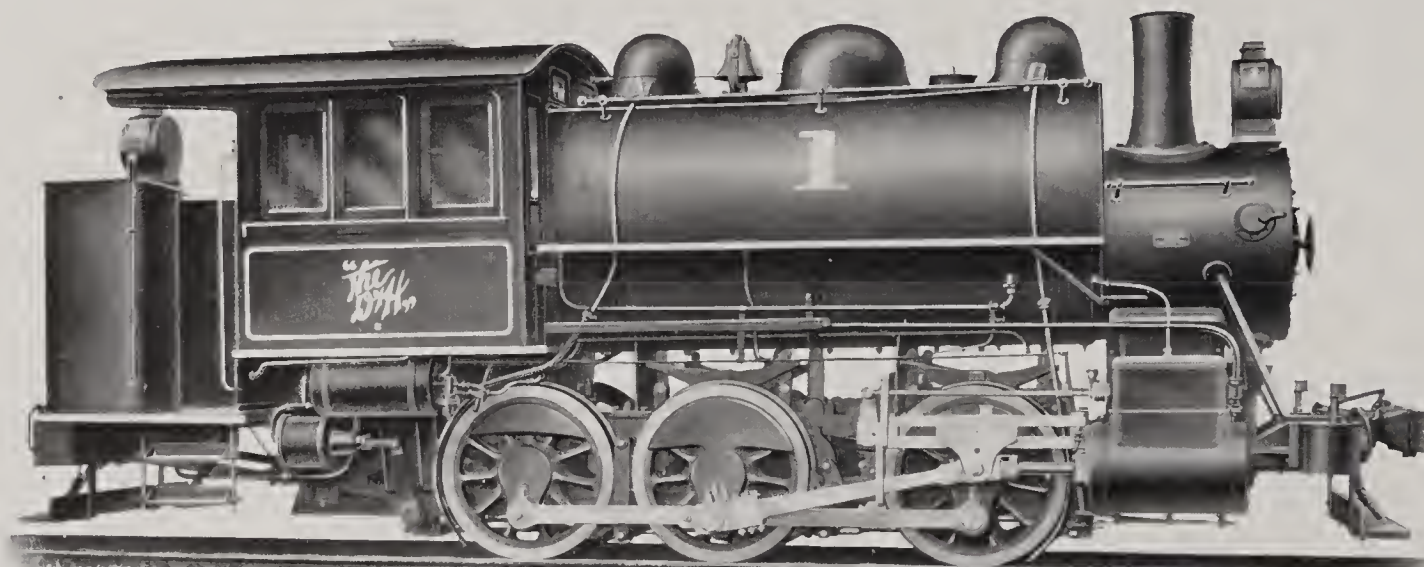
Six Wheel Tank Locomotives

O-6-O-T-TYPE

CODE WORD	Gauge of Track	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Wheel Base	Capac- ity of Water Tank	Weight in Working Order	Boiler Pres- sure	Tract- ive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
	Feet and Inches	Inches	Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
												1½%	1%	1½%	2%	2½%	3%
Allthing	3-0 to 4-8½	13x18	36	9-0	1,000	57,000	160	11,490	40	125	1,740	665	405	285	215	170	145
Alluantur	3-0 to 4-8½	14x20	44	9-6	1,100	65,000	160	12,115	40	150	1,835	705	425	300	230	185	150
Allubentia	3-0 to 4-8½	14x22	44	9-6	1,100	67,000	160	13,330	40	150	2,015	770	470	335	255	205	170
Allubescam	3-0 to 4-8½	14x24	44	9-6	1,200	75,000	160	14,550	45	160	2,200	845	510	355	275	220	180
Allucebas	4-8½	15x24	44	10-0	1,200	85,000	160	16,700	50	160	2,525	970	585	415	315	255	205
Allucebunt	4-8½	16x24	46	10-0	1,200	95,000	160	18,170	55	160	2,750	1,055	640	450	345	275	225
Allucendae	4-8½	17x24	48	10-6	1,600	105,000	170	20,800	55	175	3,150	1,215	740	520	400	320	265
Allucendos	4-8½	18x24	48	10-6	1,800	116,000	170	23,400	60	175	3,545	1,365	830	585	450	360	295

The above figures for Hauling Capacity are based on a frictional resistance of 6½ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

AMERICAN LOCOMOTIVE COMPANY



SIX WHEEL TANK LOCOMOTIVE
FOR CONTRACTORS, MINE AND INDUSTRIAL SERVICE

AMERICAN LOCOMOTIVE COMPANY

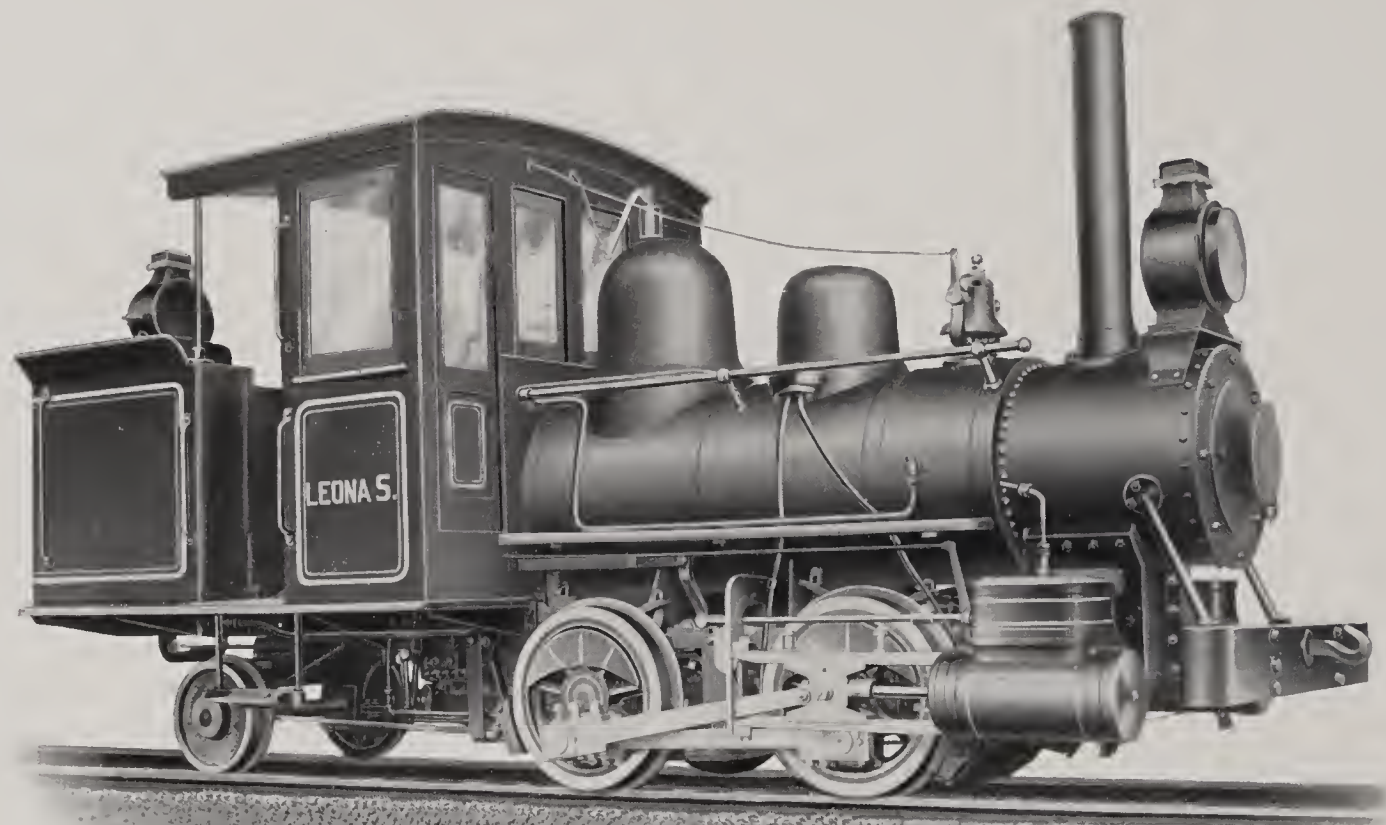
Six Wheel Tank Locomotives

O-6-O-T-TYPE

CODE WORD	Gauge of Track	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Wheel Base	Capac- ity of Water Tank	Weight in Working Order	Boiler Pres- sure	Tract- ive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
	Feet and Inches	Inches	Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Per Yard	Feet	ON	ON GRADES OF					
											LEVEL	½%	1%	1½%	2%	2½%	3%
Allucent	3-0 to 4-8½	13x18	36	9-0	1,000	57,000	160	11,490	40	125	1,740	665	405	285	215	170	145
Allucentem	3-0 to 4-8½	14x20	44	9-6	1,100	65,000	160	12,115	40	150	1,835	705	425	300	230	185	150
Alluchon	3-0 to 4-8½	14x22	44	9-6	1,100	67,000	160	13,330	40	150	2,015	770	470	335	255	205	170
Alluciamo	3-0 to 4-8½	14x24	44	9-6	1,200	75,000	160	14,550	45	160	2,200	845	510	355	275	220	180
Alluciando	4-8½	15x24	44	10-0	1,200	85,000	160	16,700	50	160	2,525	970	585	415	315	255	205
Alluciare	4-8½	16x24	46	10-0	1,200	95,000	160	18,170	55	160	2,750	1,055	640	450	345	275	225
Alluciassi	4-8½	17x24	48	10-6	1,600	105,000	170	20,800	55	175	3,150	1,215	740	520	400	320	265
Alluciato	4-8½	18x24	48	10-6	1,800	116,000	170	23,400	60	175	3,545	1,365	830	585	450	360	295

The above figures for Hauling Capacity are based on a frictional resistance of 6½ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

AMERICAN LOCOMOTIVE COMPANY



FOUR COUPLED TANK LOCOMOTIVE
FOR PLANTATION AND LOGGING SERVICE

AMERICAN LOCOMOTIVE COMPANY

Four Coupled Tank Locomotives

O-4-2-T-TYPE

CODE WORD	Diam. and Stroke of Cylinder Inches	Diam. of Driving Wheels Inches	Driving Wheel Base Feet and Inches	Total Wheel Base Feet and Inches	Capacity of Water Tank Gallons	Weight in Working Order on Drivers Pounds	Total Weight in Working Order Pounds	Boiler Pres- sure Pounds	Tract- ive Power Pounds	Weight of Lightest Rail Advised Per Yard	Radius of Sharp- est Curve Advised Feet	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
												ON LEVEL	ON GRADES OF					
													½%	1%	1½%	2%	2½%	3%
*Alluciava	6x10	24	3-6	9-3	150	11,000	15,500	150	1,915	14	60	285	105	65	45	30	25	20
*Allucina	6x12	24	3-6	9-3	150	11,500	16,000	150	2,295	14	60	345	130	80	55	40	35	25
*Allucinano	7x10	24	3-9	9-9	200	13,500	19,000	150	2,700	16	65	405	155	90	65	50	40	30
*Allucinavi	7x12	24	3-9	9-9	200	14,000	19,500	150	3,125	16	65	470	180	110	75	60	50	40
*Allucparis	8x12	26	4-0	10-0	250	17,500	24,000	150	3,760	20	70	565	215	130	90	70	55	45
*Alluctemur	8x14	26	4-0	10-0	300	18,000	24,500	150	4,395	20	70	665	255	150	110	85	65	55
†Alludebant	9x14	29	4-6	12-3	325	22,000	29,000	150	4,960	25	90	750	285	175	120	95	75	65
†Alludello	10x14	29	4-6	12-3	500	25,000	33,000	150	6,180	25	90	935	360	215	155	115	95	75
†Alludendis	10x16	30	5-0	13-0	600	28,000	37,500	150	6,800	30	95	1,025	390	240	170	130	100	85
†Alluderemo	11x16	33	5-0	13-0	700	31,000	41,000	150	7,510	35	95	1,135	435	265	185	140	115	95
†Alludevamo	12x16	36	5-3	14-0	825	34,000	45,000	160	8,700	35	100	1,315	505	305	215	165	135	110
†Alluding	12x18	36	5-3	14-0	900	36,500	49,000	160	9,790	40	100	1,480	570	345	245	185	150	125
†Alludingly	13x18	36	6-3	15-0	950	43,000	56,000	160	11,490	40	120	1,740	665	405	285	215	170	145
†Alludono	14x20	44	7-0	15-6	1,075	51,000	70,000	160	12,115	45	130	1,835	700	420	295	225	180	150
†Alludunt	14x22	44	7-0	15-6	1,075	54,000	72,000	160	13,330	45	130	2,015	770	465	330	250	200	165

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 2 feet up to 4 feet, $8\frac{1}{2}$ inches.

† Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

‡ Built for 4 feet, $8\frac{1}{2}$ inch gauge.

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AMERICAN LOCOMOTIVE COMPANY



FOUR COUPLED TANK LOCOMOTIVE
FOR PLANTATION AND LOGGING SERVICE

AMERICAN LOCOMOTIVE COMPANY

Four Coupled Tank Locomotives

O-4-2-T-TYPE

CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base	Total Wheel Base	Capacity of Water Tank	Weight in Working Order on Drivers	Total Weight in Working Order	Boiler Pressure	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharpest Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
												ON LEVEL	ON GRADES OF					
													½%	1%	1½%	2%	2½%	3%
*Alluduntur	6x10	24	3-6	9-3	150	11,500	15,000	150	1,915	16	60	285	105	65	45	35	25	20
*Alluebamus	6x12	24	3-6	9-3	150	12,000	15,500	150	2,295	16	60	345	130	80	55	40	35	25
*Alluebare	7x10	24	3-9	9-9	200	16,000	20,000	150	2,700	20	65	405	155	90	65	50	40	30
*Alluebat	7x12	24	3-9	9-9	200	16,500	20,500	150	3,125	20	65	470	180	110	75	60	50	40
*Allueram	8x12	26	4-0	10-0	250	19,000	23,000	150	3,760	20	70	565	215	130	90	70	55	45
*Allueres	8x14	26	4-0	10-0	300	19,500	23,500	150	4,395	20	70	665	255	150	110	85	65	55
†Allugabas	9x14	29	4-6	11-0	325	22,500	27,000	150	4,960	25	90	750	285	175	120	95	75	65
†Allugada	10x14	29	4-6	11-0	500	28,000	33,500	150	6,180	30	90	935	360	215	155	115	95	75
†Allugarian	10x16	30	5-0	12-0	600	33,000	37,000	150	6,800	35	95	1,025	390	240	170	130	100	85
†Allugaron	11x16	33	5-0	12-0	700	35,500	39,500	150	7,510	35	95	1,135	435	265	185	140	115	95
†Allugue	12x16	36	5-3	12-6	825	38,000	46,000	160	8,700	40	100	1,315	505	305	215	165	135	110
†Allugueis	12x18	36	5-3	12-6	900	41,000	49,000	160	9,790	40	100	1,480	570	345	245	185	150	125
†Alluguemos	13x18	36	6-3	13-6	950	48,000	56,000	160	11,490	40	120	1,740	665	405	285	215	170	145
‡Alluissent	14x20	44	7-0	14-3	1,075	59,000	71,000	160	12,115	50	130	1,835	700	420	295	225	180	150
‡Alluistis	14x22	44	7-0	14-3	1,075	60,000	72,000	160	13,330	50	130	2,015	770	465	330	250	200	165

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 2 feet up to 4 feet, $8\frac{1}{2}$ inches.

† Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

‡ Built for 4 feet, $8\frac{1}{2}$ inch gauge.

AMERICAN LOCOMOTIVE COMPANY



SIX COUPLED TANK LOCOMOTIVE
FOR PLANTATION AND LOGGING SERVICE

AMERICAN LOCOMOTIVE COMPANY

Six Coupled Tank Locomotives

O-6-2-T-TYPE

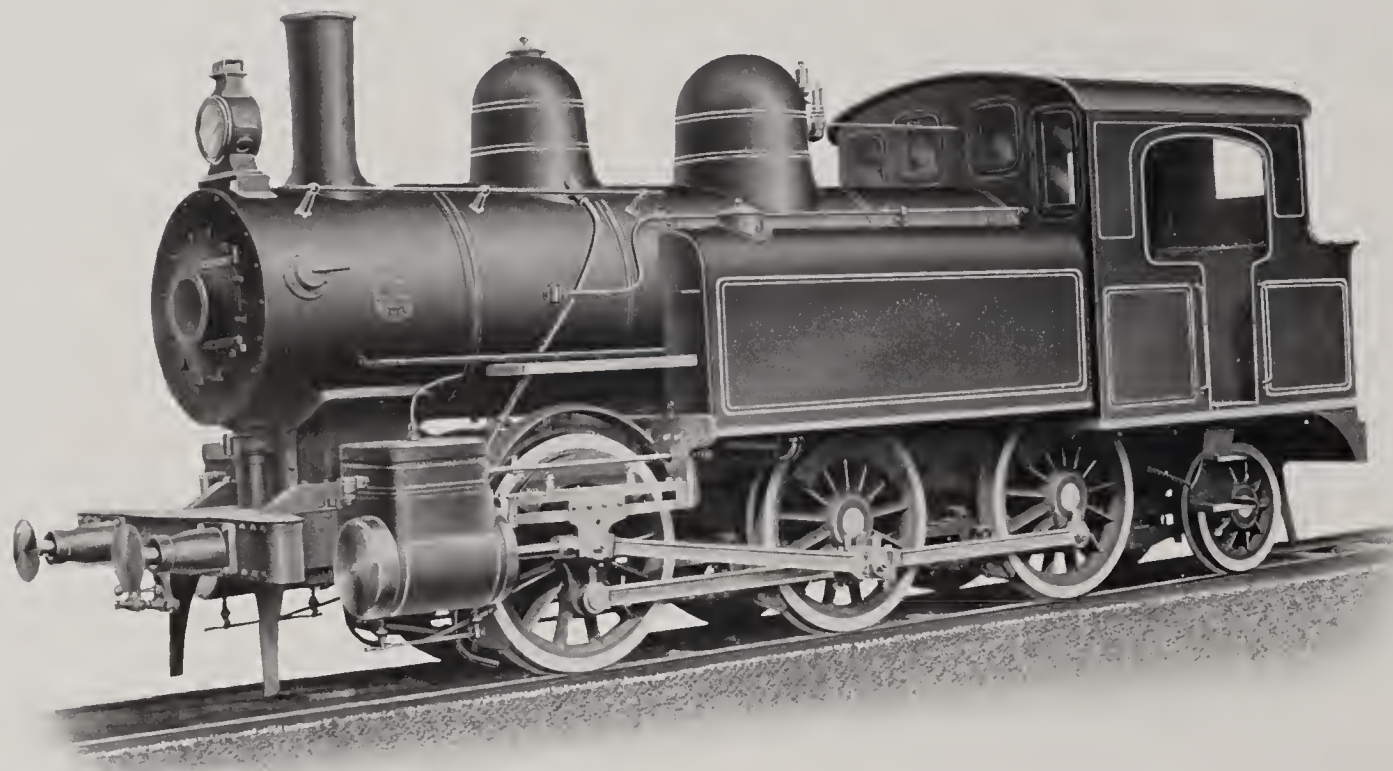
CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base	Total Wheel Base	Capacity of Water Tank	Weight in Working Order on Drivers	Total Weight in Working Order	Boiler Pressure	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
	Inches	Inches	Feet and Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
													½%	1%	1½%	2%	2½%	3%
*Allulla	8x12	26	5-6	11-3	300	19,500	27,500	150	3,760	16	100	565	215	125	90	65	50	40
*Allumage	8x14	26	5-6	11-3	300	20,000	28,000	150	4,395	16	100	660	250	150	105	80	65	55
*Allumais	9x14	29	6-0	12-0	400	23,000	32,000	150	4,960	16	110	750	285	175	120	95	75	60
*Allumano	10x14	29	6-0	12-0	500	27,000	36,000	150	6,150	20	110	930	355	210	150	110	90	75
*Allumarono	10x16	30	7-0	13-3	650	30,000	40,000	150	6,800	20	120	1,025	390	235	165	125	100	80
*Allumatore	11x16	33	8-0	14-0	750	34,000	44,000	150	7,510	25	130	1,130	435	260	180	140	110	90
*Allumelle	12x16	36	8-6	14-9	850	37,000	49,000	160	8,700	25	150	1,315	505	305	215	165	135	110
*Allumerai	12x18	36	8-6	14-9	850	40,000	52,000	160	9,790	30	150	1,480	570	345	245	185	150	125
†Allumeriez	13x18	36	9-0	16-0	950	47,000	59,000	160	11,490	35	160	1,740	665	405	285	215	170	145
†Allumerons	14x20	44	9-6	16-9	1,000	54,000	66,000	160	12,115	40	175	1,835	700	420	295	225	180	150
†Allumes	14x22	44	9-6	16-9	1,075	56,000	69,000	160	13,330	40	175	2,015	770	465	330	250	200	165

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 2 feet, 6 inches up to 4 feet, $8\frac{1}{2}$ inches.

† Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

AMERICAN LOCOMOTIVE COMPANY



SIX COUPLED TANK LOCOMOTIVE
FOR PLANTATION AND LOGGING SERVICE

AMERICAN LOCOMOTIVE COMPANY

Six Coupled Tank Locomotives

O-6-2-T-TYPE

CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base	Total Wheel Base	Capacity of Water Tank	Weight in Working Order on Drivers	Total Weight in Working Order	Boiler Pressure	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
												ON LEVEL	ON GRADES OF					
													1/2%	1%	1 1/2%	2%	2 1/2%	3%
*Allumiez	9x14	29	6-0	11-3	400	24,000	30,000	150	4,960	16	110	750	285	175	120	95	75	60
*Alluminor	10x14	29	6-0	11-3	500	29,000	35,000	150	6,180	20	110	930	355	210	150	110	90	75
*Alluminoso	10x16	30	7-0	12-6	650	32,000	39,000	150	6,800	25	120	1,025	390	235	165	125	100	80
*Allumnaba	11x16	33	8-0	13-3	800	36,000	45,000	150	7,510	25	130	1,130	435	260	180	140	110	90
*Allumnar	12x16	36	8-6	13-9	950	40,000	49,000	160	8,700	30	150	1,315	505	305	215	165	135	110
*Allumneis	12x18	36	8-6	13-9	950	44,000	53,000	160	9,790	30	150	1,480	570	345	245	185	150	125
†Allungammo	13x18	36	9-0	15-0	1,000	50,000	60,000	160	11,490	35	160	1,740	665	405	285	215	170	145
†Allungando	14x20	44	9-6	15-9	1,100	59,000	68,000	160	12,115	40	175	1,835	700	420	295	225	180	150
†Allungare	14x22	44	9-6	15-9	1,100	61,000	70,000	160	13,330	40	175	2,015	770	465	330	250	200	165
†Allungassi	14x24	44	9-6	15-9	1,200	68,000	78,000	160	14,550	40	175	2,200	845	510	355	275	220	180
†Allungato	15x24	44	10-0	16-6	1,200	78,000	88,000	160	16,700	45	200	2,525	970	585	415	315	255	205
†Allungava	16x24	46	10-0	17-0	1,200	87,000	99,000	160	18,170	50	200	2,750	1,055	640	450	345	275	225
†Allunghero	17x24	48	10-6	17-6	1,600	97,000	109,000	170	20,800	55	225	3,150	1,215	740	520	400	320	265
†Allunghi	18x24	48	10-6	18-0	1,800	108,000	120,000	170	23,400	60	225	3,545	1,365	830	585	450	360	295

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 2 feet, 6 inches up to 4 feet, $8\frac{1}{2}$ inches.

† Built for gauges from 3 feet to 4 feet, $8\frac{1}{2}$ inches.

‡ Built for 4 feet, $8\frac{1}{2}$ inch gauge.

AMERICAN LOCOMOTIVE COMPANY



FOUR COUPLED TANK LOCOMOTIVE
FOR SUBURBAN, PLANTATION AND LOGGING SERVICE

AMERICAN LOCOMOTIVE COMPANY

Four Coupled Tank Locomotives

2-4-2-T-TYPE

CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base	Total Wheel Base	Capacity of Water Tank	Weight in Working Order on Drivers	Total Weight in Working Order	Boiler Pressure	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
												ON LEVEL	ON GRADES OF					
													1/2%	1%	1 1/2%	2%	2 1/2%	3%
*Allungo	9x14	29	4-6	16-0	325	21,000	30,000	150	4,960	20	90	750	285	170	120	90	70	60
*Allunyabas	10x14	29	4-6	16-0	500	25,000	36,000	150	6,150	25	90	930	355	215	150	115	90	75
*Allunyan	10x16	30	5-0	17-0	600	29,500	42,000	150	6,800	30	95	1,025	390	235	165	125	100	80
*Allunyaria	11x16	33	5-0	17-0	700	31,000	44,000	150	7,510	30	95	1,135	435	260	185	140	110	90
*Allunyaste	12x16	36	5-3	20-0	825	35,000	50,000	160	8,700	35	100	1,315	505	305	215	165	135	110
*Allunyemos	12x18	36	5-3	20-0	900	37,000	53,000	160	9,790	40	100	1,480	570	345	245	185	150	125
*Allurement	13x18	36	6-3	22-0	950	43,000	62,000	160	11,490	40	120	1,740	665	405	285	215	170	140
†Allurer	14x20	44	7-0	24-0	1,000	52,000	74,000	160	12,115	45	130	1,830	695	415	290	220	175	145
†Allusero	14x22	44	7-0	24-0	1,075	58,000	78,000	160	13,330	50	130	2,010	765	460	325	245	195	160
†Allusinghi	14x24	44	7-0	24-0	1,125	67,000	87,000	160	14,550	60	130	2,195	840	505	350	270	215	175
†Allusingo	15x24	44	7-0	25-1	1,125	76,000	98,000	160	16,700	65	150	2,520	965	580	410	310	250	200
†Allusions	16x24	46	7-0	25-1	1,200	87,000	112,000	160	18,170	70	150	2,740	1,045	630	440	335	265	215
†Allusionum	17x24	48	7-0	25-1	1,400	93,000	120,000	170	20,800	75	150	3,140	1,205	725	510	385	305	255
†Allusis	18x24	48	7-6	26-0	1,700	104,000	135,000	170	23,400	85	175	3,535	1,355	820	575	440	350	285

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

† Built for 4 feet, $8\frac{1}{2}$ inch gauge.

AMERICAN LOCOMOTIVE COMPANY



FOUR COUPLED TANK LOCOMOTIVE
FOR SUBURBAN, LOGGING AND PLANTATION SERVICE

AMERICAN LOCOMOTIVE COMPANY

Four Coupled Tank Locomotives

2-4-2-T-TYPE

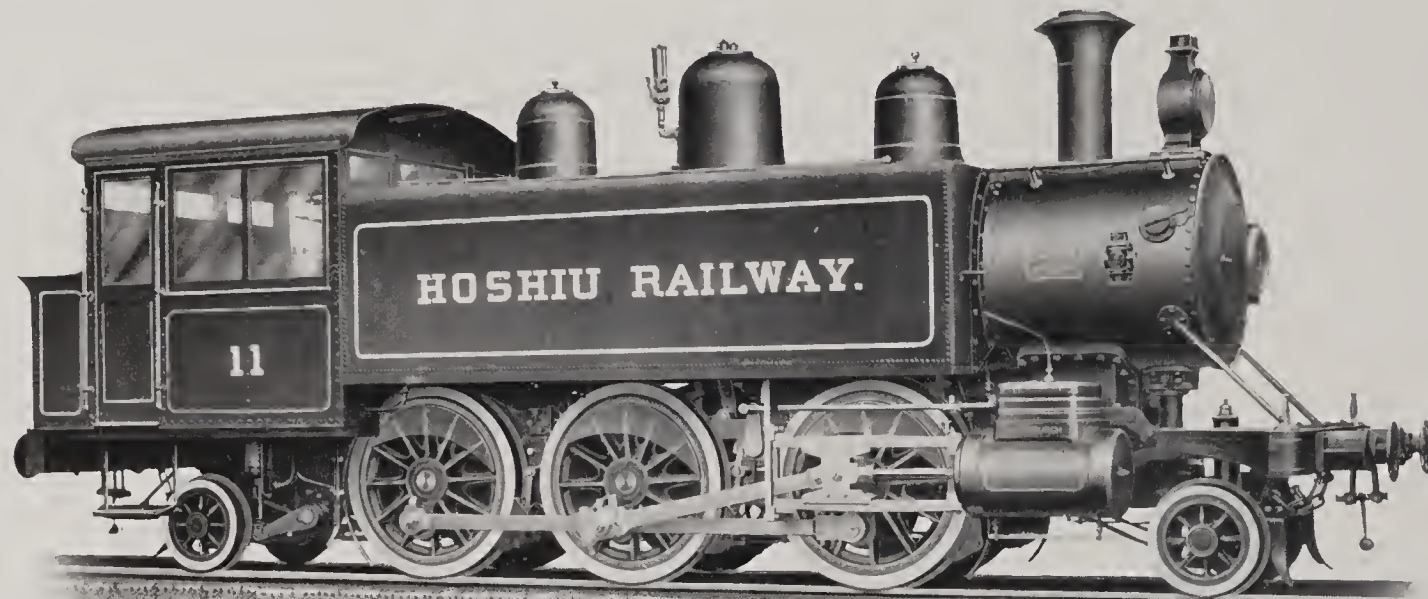
CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driv- ing Wheel Base	Total Wheel Base	Capac- ity of Water Tank	Weight in Working Order on Drivers	Total Weight in Work- ing Order	Boiler Pres- sure	Tract- ive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
	Inches	Inches	Feet and Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Pounds	Per Yard	Feet	ON	ON GRADES OF					
												LEVEL	½%	1%	1½%	2%	2½%	3%
*Allusively	9x14	29	4-6	16-0	325	21,000	30,000	150	4,960	20	90	750	285	170	120	90	70	60
*Alluso	10x14	29	4-6	16-0	500	25,000	36,000	150	6,150	25	90	930	355	215	150	115	90	75
*Allusory	10x16	30	5-0	17-0	600	29,500	42,000	150	6,800	30	95	1,025	390	235	165	125	100	80
*Allusuram	11x16	33	5-0	17-0	700	31,000	44,000	150	7,510	30	95	1,135	435	260	185	140	110	90
*Allusuris	12x16	36	5-3	20-0	825	35,000	50,000	160	8,700	35	100	1,315	505	305	215	165	135	110
*Alluvial	12x18	36	5-3	20-0	900	37,000	53,000	160	9,790	40	100	1,480	565	340	240	185	145	120
*Alluviando	13x18	36	6-3	22-0	950	43,000	62,000	160	11,490	40	120	1,740	665	405	285	215	170	140
†Alluviasse	14x20	44	7-0	24-0	1,000	52,000	74,000	160	12,115	45	130	1,830	695	415	290	220	175	145
†Alluviava	14x22	44	7-0	24-0	1,075	58,000	78,000	160	13,330	50	130	2,010	765	460	325	245	195	160
†Alluvion	14x24	44	7-0	24-0	1,125	67,000	87,000	160	14,550	60	130	2,195	840	505	350	270	215	175
†Alluvius	15x24	44	7-0	25-1	1,125	76,000	98,000	160	16,700	65	150	2,520	965	580	410	310	250	200
†Alluvium	16x24	46	7-0	25-1	1,200	87,000	112,000	160	18,170	70	150	2,740	1,045	630	440	335	265	215
†Allux	17x24	48	7-0	25-1	1,400	93,000	120,000	170	20,800	75	150	3,140	1,205	725	510	385	305	255
†Alluximus	18x24	48	7-6	26-0	1,700	104,000	135,000	170	23,400	85	175	3,535	1,355	820	575	440	350	285

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

† Built for 4 feet, $8\frac{1}{2}$ inch gauge.

AMERICAN LOCOMOTIVE COMPANY.



SIX COUPLED TANK LOCOMOTIVE
FOR LOGGING, MINE AND SUBURBAN SERVICE

AMERICAN LOCOMOTIVE COMPANY

Six Coupled Tank Locomotives

2-6-2-T-TYPE

CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base	Total Wheel Base	Capacity of Water Tank	Weight in Working Order on Drivers	Total Weight in Working Order	Boiler Pressure	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
	Inches	Inches	Feet and Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
													1½%	1%	1½%	2%	2½%	3%
*Alluxissem	12x16	36	8-0	19-6	950	38,000	52,000	160	8,700	30	150	1,315	505	305	215	165	135	110
*Alluxisti	12x18	36	8-0	19-6	950	40,000	54,000	160	9,790	30	150	1,480	570	345	245	185	150	125
†Allvater	13x18	36	9-0	21-3	1,000	47,000	62,000	160	11,490	35	160	1,740	665	405	285	215	170	140
†Allweise	14x20	44	9-6	22-0	1,100	53,000	71,000	160	12,115	35	175	1,835	700	420	295	225	180	150
†Allwo	14x22	44	9-6	22-0	1,100	55,000	73,000	160	13,330	40	175	2,015	770	465	330	250	200	165
†Allyatem	14x24	44	9-6	22-0	1,200	62,000	82,000	160	14,550	40	175	2,200	845	510	355	275	220	180
†Allyattis	15x24	44	10-0	22-9	1,200	71,000	91,000	160	16,700	40	200	2,525	970	585	415	315	255	205
†Allyl	16x24	46	10-0	22-9	1,200	81,000	101,000	160	18,170	45	200	2,750	1,055	640	450	345	275	225
†Allylamine	17x24	48	10-6	23-9	1,600	89,000	111,000	170	20,800	50	225	3,150	1,215	740	520	400	320	265
†Allyleme	18x24	48	10-6	23-9	1,800	101,000	123,000	170	23,400	55	225	3,545	1,365	830	585	450	360	295

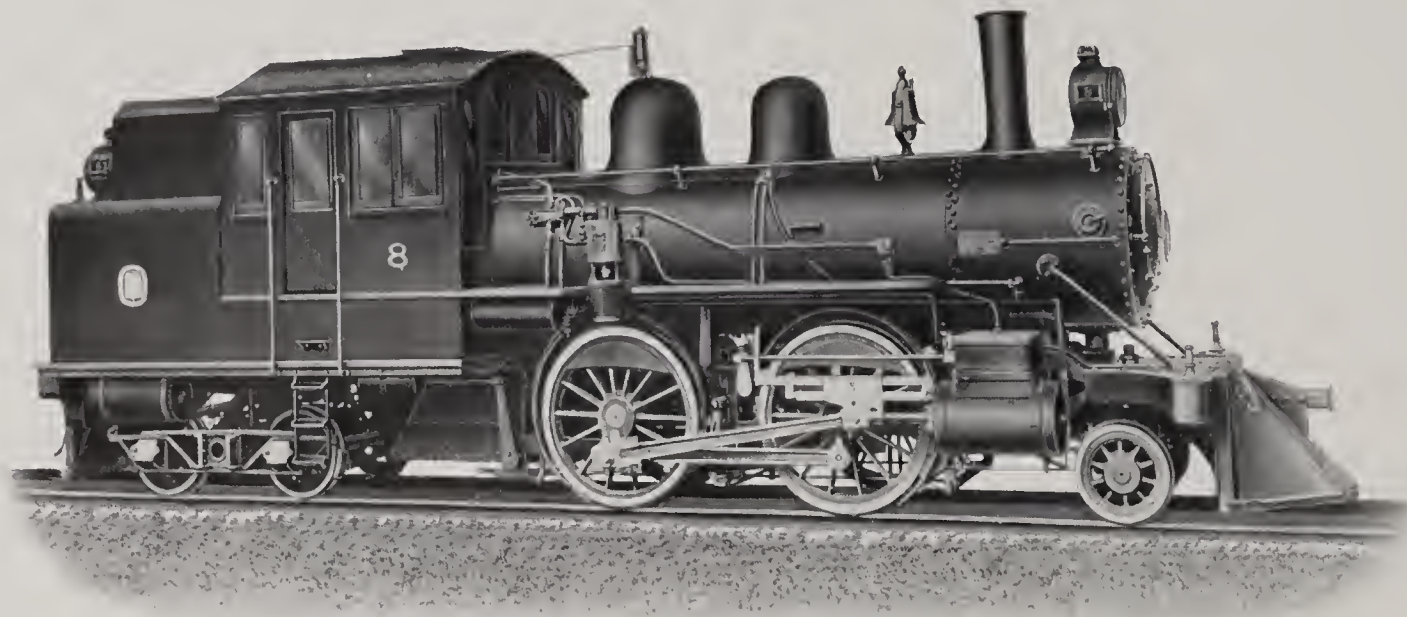
The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 2 feet, 6 inches up to 4 feet, $8\frac{1}{2}$ inches.

† Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

‡ Built for 4 feet, $8\frac{1}{2}$ inch gauge.

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AMERICAN LOCOMOTIVE COMPANY



FOUR COUPLED, DOUBLE ENDER LOCOMOTIVE
FOR SUBURBAN PASSENGER AND FREIGHT SERVICE

AMERICAN LOCOMOTIVE COMPANY

Four Coupled, Double Ender Locomotives

2-4-4-T-TYPE

CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base	Total Wheel Base	Capacity of Water Tank	Weight in Working Order on Drivers	Total Weight in Working Order	Boiler Pressure	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharpest Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
												ON LEVEL	ON GRADES OF					
													1/2%	1%	1 1/2%	2%	2 1/2%	3%
*Allyrio	12x18	42	5-3	23-0	800	37,000	51,000	160	8,390	35	115	1,265	480	290	200	155	120	100
*Allzualt	13x18	46	6-0	25-9	1,000	40,000	67,000	160	8,990	35	135	1,345	510	305	210	160	125	105
†Allzugut	14x20	48	6-0	25-9	1,200	45,000	72,000	160	11,110	40	135	1,660	635	380	265	200	160	130
†Allzulang	14x22	50	6-3	28-3	1,500	47,500	82,500	160	11,725	45	150	1,760	665	400	280	210	165	135
†Almacaeras	15x22	50	6-6	29-9	2,000	57,000	103,000	160	13,465	50	170	2,015	760	455	315	235	185	150
†Almacaero	16x24	56	7-0	30-0	2,500	61,000	116,000	160	14,920	50	180	2,285	845	505	350	260	205	165
†Almacantar	17x24	62	7-0	31-4	2,500	70,000	133,000	170	16,200	60	200	2,425	920	545	380	280	220	180

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

† Built for 4 feet, $8\frac{1}{2}$ inch gauge.

AMERICAN LOCOMOTIVE COMPANY



"FORNEY," FOUR COUPLED TANK LOCOMOTIVE
FOR SUBURBAN, PLANTATION AND LOGGING SERVICE

AMERICAN LOCOMOTIVE COMPANY

"Forney," Four Coupled Tank Locomotives

O-4-4-T-TYPE

CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base Feet and Inches	Total Wheel Base Feet and Inches	Capacity of Water Tank Gallons	Weight in Working Order on Drivers Pounds	Total Weight in Working Order Pounds	Boiler Pressure Pounds	Tractive Power Pounds	Weight of Lightest Rail Advised Per Yard	Radius of Sharp- est Curve Advised Feet	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE)						
												ON LEVEL	ON GRADES OF					
													½%	1%	1½%	2%	2½%	3%
*Almacenado	6x10	24	3-6	10-9	300	11,000	17,500	150	1,915	14	75	285	105	65	45	35	25	20
*Almacenaje	6x12	24	3-6	10-9	300	11,500	18,000	150	2,295	14	75	345	130	80	55	40	35	25
*Almaceneis	7x10	24	3-9	11-6	400	13,500	21,500	150	2,700	16	80	405	155	90	65	50	40	30
*Almacerias	7x12	24	3-9	11-6	400	14,000	22,000	150	3,125	16	80	470	180	110	75	60	50	40
*Almachio	8x12	26	4-0	12-3	500	17,500	26,000	150	3,760	20	85	565	215	130	90	70	55	45
*Almachtig	8x14	26	4-0	12-3	500	18,000	26,500	150	4,395	20	85	665	255	150	110	85	65	55
†Almacigara	9x14	29	4-6	13-3	600	22,000	32,000	150	4,960	25	100	750	285	175	120	95	75	65
†Almacigues	10x14	29	4-6	13-3	650	25,000	36,000	150	6,180	25	100	935	360	215	155	115	95	75
†Almadaini	10x16	30	5-0	15-0	700	28,000	39,000	150	6,800	30	115	1,025	390	240	170	130	100	85
†Almadaneta	11x16	33	5-0	15-0	700	32,500	45,000	150	7,510	30	115	1,135	435	265	185	140	115	95
†Almadia	12x16	36	5-3	15-9	825	36,000	50,000	160	8,700	35	130	1,315	505	305	215	160	130	105
†Almadiado	12x18	36	5-3	15-9	900	38,000	55,000	160	9,790	40	130	1,475	565	340	240	180	135	120
†Almadieras	13x18	36	6-3	17-6	950	44,000	60,000	160	11,490	40	150	1,740	665	405	285	215	170	140
‡Almadraba	14x20	44	7-0	20-0	1,000	52,000	72,000	160	12,115	45	180	1,835	700	420	295	225	180	150
‡Almadraque	14x22	44	7-0	20-0	1,075	54,000	75,000	160	13,330	45	180	2,015	770	465	330	250	200	165

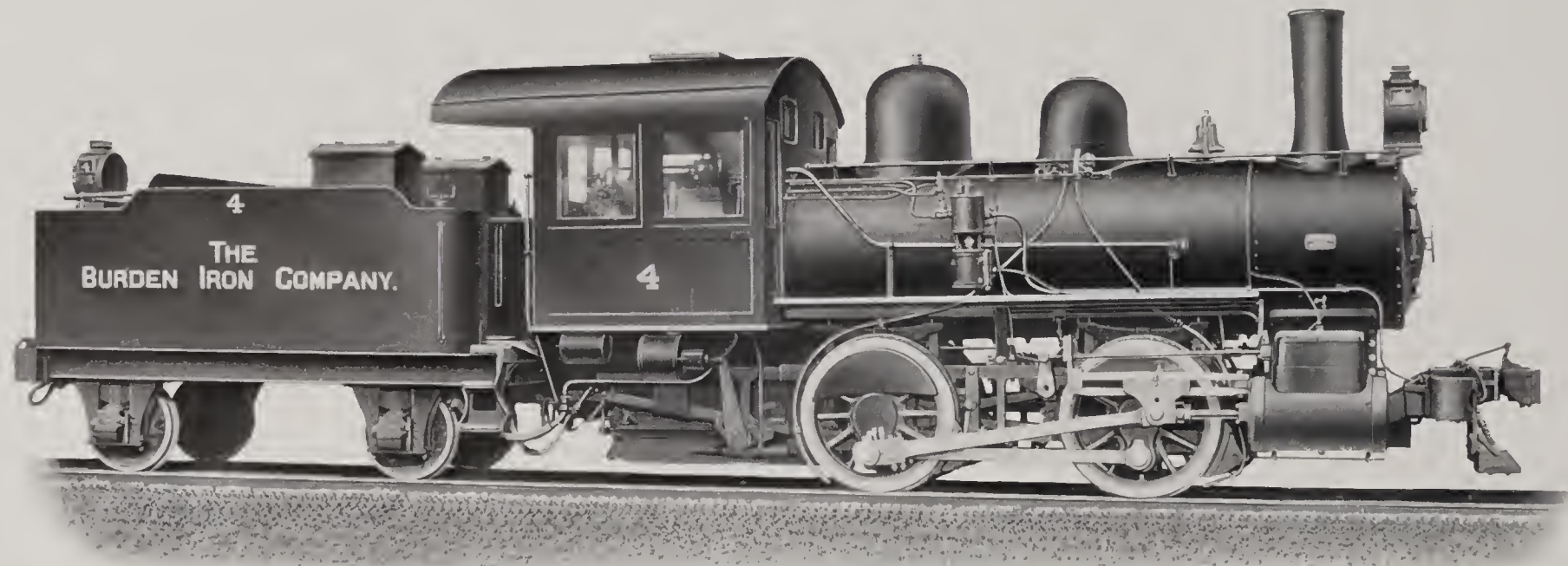
The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for any practicable gauge.

† Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

‡ Built for 4 feet, $8\frac{1}{2}$ inch gauge.

AMERICAN LOCOMOTIVE COMPANY



FOUR WHEEL LOCOMOTIVE

FOR CONTRACTORS, PLANTATION AND INDUSTRIAL SERVICE

AMERICAN LOCOMOTIVE COMPANY

Four Wheel Locomotives

O-4-O-TYPE

WEIGHTS AND HAULING CAPACITIES BASED ON 150 POUNDS BOILER PRESSURE

CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base	Capacity of Water Tank	Weight in Working Order	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE AND TENDER)						
	Inches	Inches	Feet and Inches	Gallons	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
										½%	1%	1½%	2%	2½%	3%
*Almadrena	8x12	26	4-0	400	18,000	3,760	20	30	565	215	125	90	65	50	40
*Almafega	8x14	26	4-0	400	18,500	4,395	20	30	665	250	150	105	80	65	50
†Almagesto	9x14	29	4-6	500	22,000	4,960	25	35	745	280	170	120	90	70	60
†Almagral	10x14	29	4-6	500	26,500	6,180	30	35	930	355	215	150	115	90	70
†Almagramos	10x16	30	5-0	600	29,000	6,800	30	40	1,020	385	230	160	120	95	75
†Almagrando	11x16	33	5-0	700	32,000	7,510	35	40	1,130	430	260	180	135	110	90

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for any practicable gauge.

† Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

AMERICAN LOCOMOTIVE COMPANY



FOUR WHEEL LOCOMOTIVE

FOR CONTRACTORS, PLANTATION AND INDUSTRIAL SERVICE

AMERICAN LOCOMOTIVE COMPANY

Four Wheel Locomotives

O-4-O-TYPE

CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base	Capacity of Water Tank	Weight in Working Order	Boiler Pressure	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharpest Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE AND TENDER)						
	Inches	Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
											½%	1%	1½%	2%	2½%	3%
*Almagraqua	12x16	36	5-3	1,000	35,000	160	8,700	35	45	1,310	500	300	210	160	125	100
*Almagraron	12x18	36	5-3	1,500	38,000	160	9,790	40	45	1,470	560	335	235	175	140	110
*Almagrases	13x18	36	6-3	1,500	44,000	160	11,490	40	50	1,730	660	395	275	210	165	130
†Almagreras	14x20	44	7-0	2,000	50,000	160	12,115	45	55	1,815	690	410	285	215	170	135
†Almahalla	14x22	44	7-0	2,000	51,000	160	13,330	45	55	2,005	760	455	320	240	190	155
†Almahdi	15x22	50	7-0	2,500	60,000	160	13,460	50	65	2,015	760	450	310	235	185	145
†Almainha	16x24	50	7-6	2,500	73,000	160	16,715	65	70	2,510	950	570	395	300	235	190
†Almaizal	17x24	50	7-6	3,000	82,000	160	18,865	70	70	2,630	1,070	640	445	335	260	210
†Almalafas	18x24	50	7-6	3,000	92,000	160	21,150	80	70	3,175	1,205	720	505	380	305	245

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

† Built for 4 feet, $8\frac{1}{2}$ inch gauge.

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AMERICAN LOCOMOTIVE COMPANY



FOUR COUPLED LOCOMOTIVE
FOR PASSENGER AND PLANTATION SERVICE

AMERICAN LOCOMOTIVE COMPANY

Four Coupled Locomotives

2-4-0-TYPE

CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base Feet and Inches	Total Wheel Base Engine Feet and Inches	Capacity of Water Tank Gallons	Weight in Working Order on Drivers Pounds	Total Weight in Working Order Pounds	Boiler Pressure Pounds	Tractive Power Pounds	Weight of Lightest Rail Advised Per Yard	Radius of Sharp- est Curve Advised Feet	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE AND TENDER)						
												ON LEVEL	ON GRADES OF					
													½%	1%	1½%	2%	2½%	3%
*Almalaques	8x14	29	4-6	9-9	600	17,500	23,000	150	3,900	20	90	590	225	135	95	75	60	45
*Almaleque	9x14	29	4-6	9-9	700	21,500	28,000	150	4,960	25	90	735	275	165	115	85	65	50
*Almallos	10x14	29	4-6	9-9	800	26,000	31,000	150	6,180	30	90	925	350	205	145	105	85	65
*Almamun	10x16	30	5-0	10-3	800	28,500	34,500	150	6,800	30	95	1,020	385	230	160	120	95	75
*Almanacchi	11x16	33	5-0	10-3	1,000	31,000	37,000	150	7,510	30	95	1,125	425	255	175	130	105	80
*Almanacco	12x16	36	5-3	10-9	1,200	33,500	40,000	160	8,700	35	100	1,305	495	295	205	155	120	95
*Almanach	12x18	36	5-3	10-9	1,500	37,000	44,000	160	9,790	40	100	1,465	555	330	230	170	135	105
*Almanakken	13x18	36	6-3	11-6	1,500	43,000	50,000	160	11,490	40	120	1,725	655	390	270	205	160	130
†Almancebe	14x22	44	7-0	13-6	2,000	50,000	62,000	160	13,330	45	130	2,000	755	450	315	235	185	150
†Almanchar	16x24	56	7-6	14-0	2,500	70,000	84,000	160	14,920	60	150	2,230	835	490	340	250	190	155
†Almandache	17x24	56	7-6	14-0	3,000	80,000	94,000	170	17,900	70	150	2,670	1,005	600	415	310	240	190

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

† Built for 4 feet, $8\frac{1}{2}$ inch gauge.

AMERICAN LOCOMOTIVE COMPANY



SIX WHEEL SWITCHING LOCOMOTIVE

AMERICAN LOCOMOTIVE COMPANY

Six Wheel Switching Locomotives

O-6-O-TYPE

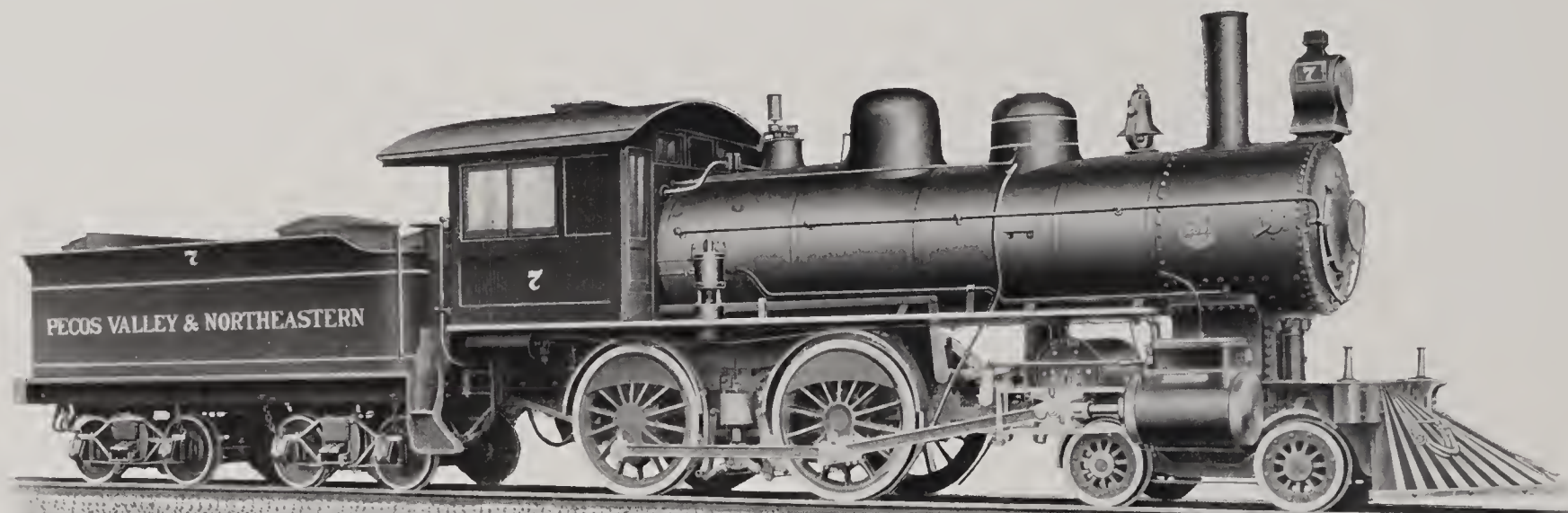
CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base	Capacity of Water Tank	Weight in Working Order	Boiler Pressure	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharpest Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE AND TENDER)						
										ON LEVEL	ON GRADES OF					
											½%	1%	1½%	2%	2½%	3%
*Almendra	12x16	33	8-0	1,000	39,000	160	9,495	30	100	1,430	545	330	230	175	120	110
*Almandres	13x18	36	9-0	1,500	49,000	160	11,490	35	125	1,725	655	390	270	205	160	130
*Almanias	14x20	38	9-6	1,500	63,000	160	14,000	40	150	2,100	800	480	330	250	200	160
†Almanio	15x22	42	10-0	1,800	72,000	160	16,000	40	160	2,400	910	545	385	290	220	185
†Almanjarra	16x24	46	10-0	2,500	82,000	160	18,150	50	160	2,710	1,030	615	430	320	250	200
†Almansor	17x24	50	10-6	2,500	94,000	170	20,100	55	175	3,015	1,145	685	475	355	280	225
†Almarada	18x24	50	11-0	3,000	104,000	180	23,800	60	200	3,575	1,355	815	570	430	335	270

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

† Built for 4 feet, $8\frac{1}{2}$ inch gauge.

AMERICAN LOCOMOTIVE COMPANY



EIGHT WHEEL PASSENGER LOCOMOTIVE

AMERICAN LOCOMOTIVE COMPANY

Eight Wheel Passenger Locomotives

4-4-0-TYPE

CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base	Total Wheel Base Engine	Capacity of Water Tank	Weight in Working Order on Drivers	Total Weight in Working Order	Boiler Pressure	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE AND TENDER)						
	Inches	Inches	Feet and Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
													½%	1%	1½%	2%	2½%	3%
*Almarbatar	13x18	48	7-0	18-5	1,500	35,000	54,000	160	8,620	35	185	1,285	480	285	195	145	110	90
*Almarbato	14x20	50	7-0	18-5	1,800	43,000	65,000	160	10,660	40	185	1,565	595	350	240	180	135	110
*Almarcha	14x22	50	7-3	19-6	2,000	47,000	72,000	160	11,700	40	200	1,745	650	385	260	195	145	115
*Almarjen	15x22	56	7-3	19-6	2,500	50,000	77,000	170	12,700	40	200	1,890	705	415	280	205	160	125
*Almarraes	16x24	60	7-3	20-10	2,500	56,000	86,000	170	14,800	50	220	2,220	830	500	335	245	190	145
†Almarraja	17x24	62	8-6	22-11	3,000	64,000	96,000	170	16,150	55	250	2,410	900	530	365	270	205	160
†Almarrega	18x24	62	9-0	23-4	3,500	70,000	110,000	170	18,100	60	275	2,695	1,005	595	410	300	230	185

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

† Built for 4 feet, $8\frac{1}{2}$ inch gauge.

AMERICAN LOCOMOTIVE COMPANY



MOGUL FREIGHT LOCOMOTIVE

AMERICAN LOCOMOTIVE COMPANY

Mogul Freight Locomotives

2-6-0-TYPE

CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base	Total Wheel Base Engine	Capacity of Water Tank	Weight in Working Order on Drivers	Total Weight in Working Order	Boiler Pressure	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE AND TENDER)						
	Inches	Inches	Feet and Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
													½%	1%	1½%	2%	2½%	3%
*Almartagas	13x18	36	9-3	15-3	1,500	46,000	52,000	160	11,490	30	155	1,725	655	390	270	205	160	130
*Almastica	14x22	44	10-7	17-6	1,800	65,000	76,000	170	14,000	40	165	2,100	800	480	330	250	200	160
*Almatero	15x24	48	11-2	18-5	2,000	74,000	86,000	170	16,200	45	185	2,400	910	540	380	285	220	180
*Almatriche	16x24	50	12-0	19-6	2,500	83,000	96,000	170	17,600	45	200	2,635	990	590	405	305	235	190
†Almaturos	17x24	50	13-0	20-2	3,000	91,000	105,000	170	20,100	50	250	3,010	1,140	680	470	350	275	220
†Almazaquen	18x24	50	13-0	20-8	3,500	99,000	114,000	170	22,500	55	250	3,370	1,270	760	525	390	310	250

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

† Built for $\frac{4}{4}$ feet, $8\frac{1}{2}$ inch gauge.

AMERICAN LOCOMOTIVE COMPANY



TEN WHEEL LOCOMOTIVE
FOR PASSENGER AND FREIGHT SERVICE

AMERICAN LOCOMOTIVE COMPANY

Ten Wheel Locomotives

4-6-0-TYPE

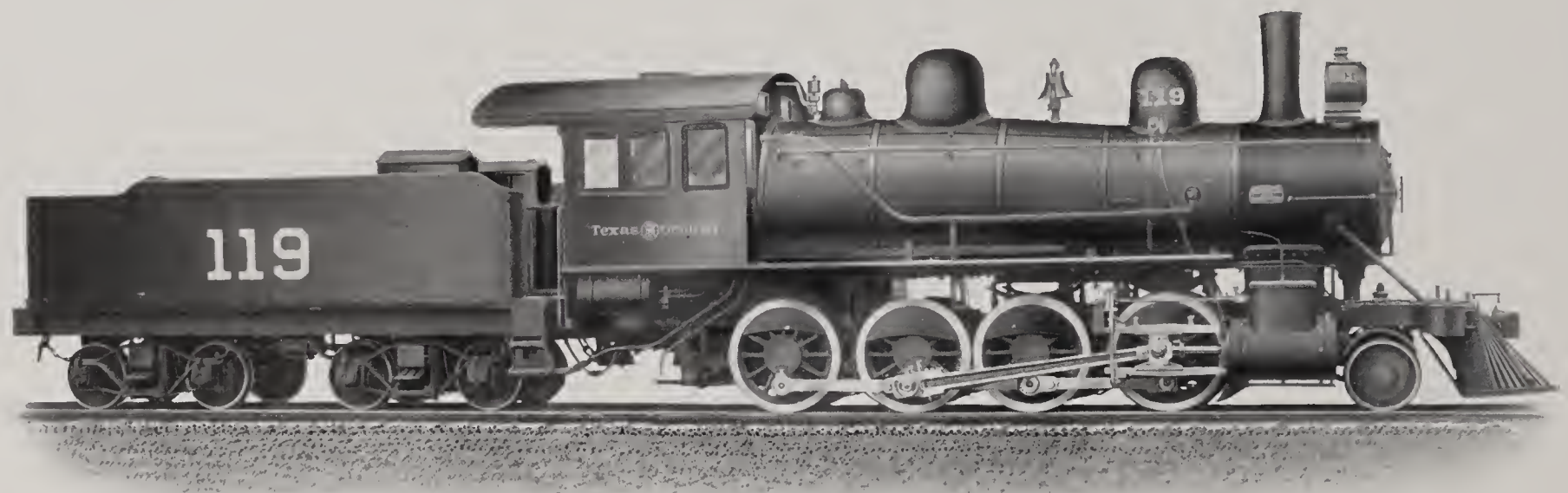
CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base	Total Wheel Base Engine	Capacity of Water Tank	Weight in Working Order on Drivers	Total Weight in Working Order	Boiler Pressure	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE AND TENDER)						
	Inches	Inches	Feet and Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Pounds	Per Yard	Feet	ON	ON GRADES OF					
												LEVEL	½%	1%	1½%	2%	2½%	3%
*Almazaras	13x18	40	9-0	18-9	1,500	44,000	58,000	160	10,350	30	155	1,550	580	345	230	175	140	110
*Almazarero	14x20	44	9-6	19-6	1,800	52,000	69,000	160	12,150	35	165	1,815	685	405	280	210	160	130
*Almazarron	15x22	50	10-0	20-0	2,000	58,000	77,000	160	13,500	40	180	2,020	760	450	310	230	180	140
*Almazem	16x24	56	10-6	20-7	2,500	71,000	94,000	170	15,800	40	185	2,355	880	520	360	265	205	165
†Almazini	17x24	56	10-6	20-7	3,000	82,000	106,000	170	17,900	45	185	2,670	1,000	590	410	300	235	185
†Almehrab	18x24	56	12-0	22-4	3,500	88,000	117,000	170	20,000	50	225	2,985	1,120	660	455	335	260	210

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

† Built for 4 feet, $8\frac{1}{2}$ inch gauge.

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AMERICAN LOCOMOTIVE COMPANY



CONSOLIDATION FREIGHT LOCOMOTIVE

AMERICAN LOCOMOTIVE COMPANY

Consolidation Freight Locomotives

2-8-0-TYPE

CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base	Total Wheel Base Engine	Capacity of Water Tank	Weight in Working Order on Drivers	Total Weight in Working Order	Boiler Pressure	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharp- est Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE AND TENDER)						
	Inches	Inches	Feet and Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
													½%	1%	1½%	2%	2½%	3%
*Almeice	14x20	38	11-6	17-6	1,800	60,000	68,000	160	14,000	35	180	2,100	795	475	330	245	195	155
*Almeideas	15x22	42	12-2	19-0	2,000	68,000	77,000	160	16,000	35	200	2,400	905	540	375	280	220	180
*Almeitiga	16x24	46	13-3	20-0	2,500	84,000	95,000	160	18,150	40	225	2,720	1,025	610	425	315	250	200
*Almejas	17x24	50	14-0	21-4	3,000	92,000	104,000	170	20,100	40	250	3,010	1,140	680	470	350	275	220
*Almelik	18x24	50	14-0	21-4	3,500	102,000	115,000	170	22,500	45	275	3,370	1,270	760	525	390	310	250
†Almenabais	19x24	50	14-0	21-4	3,500	110,000	124,000	170	25,000	45	275	3,755	1,420	850	590	445	345	280
†Almenadas	20x24	50	14-0	21-4	4,000	120,000	135,000	170	27,800	50	275	4,175	1,580	945	655	495	385	310

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

† Built for 4 feet, $8\frac{1}{2}$ inch gauge.

AMERICAN LOCOMOTIVE COMPANY



EIGHT WHEEL SWITCHING LOCOMOTIVE

AMERICAN LOCOMOTIVE COMPANY

Eight Wheel Switching Locomotives

O-8-O-TYPE

CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Wheel Base Engine	Capacity of Water Tank	Weight in Working Order	Boiler Pressure	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharpest Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE AND TENDER)						
	Inches	Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
											½%	1%	1½%	2%	2½%	3%
*Almenado	14x20	38	11-6	1,800	63,000	160	14,000	35	180	2,100	795	475	330	245	195	155
*Almenaje	15x22	42	12-2	2,000	72,000	160	16,000	40	200	2,400	905	540	375	280	220	180
*Almenamos	16x24	46	13-3	2,500	85,000	160	18,150	40	225	2,720	1,025	610	420	320	250	200
*Almenariam	17x24	50	14-0	3,000	94,000	170	20,100	40	250	3,010	1,140	680	470	350	275	220
*Almenaron	18x24	50	14-0	3,500	108,000	170	22,500	45	275	3,370	1,270	760	525	390	310	250
†Almendolon	19x24	50	14-0	3,500	119,000	170	25,000	50	275	3,755	1,420	850	590	445	345	280
†Almendrada	20x24	50	14-0	4,000	130,000	170	27,800	55	275	4,175	1,580	945	655	495	385	310

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for gauges from 3 feet up to 4 feet, $8\frac{1}{2}$ inches.

† Built for 4 feet, $8\frac{1}{2}$ inch gauge.

AMERICAN LOCOMOTIVE COMPANY



SIX COUPLED LOCOMOTIVE
FOR LOGGING SERVICE

AMERICAN LOCOMOTIVE COMPANY

Six Coupled Locomotives

2-6-2-TYPE

WEIGHTS AND HAULING CAPACITIES BASED ON 165 POUNDS BOILER PRESSURE

CODE WORD	Diam. and Stroke of Cylinder	Diam. of Driving Wheels	Driving Wheel Base	Total Wheel Base Engine	Capacity of Water Tank	Weight in Working Order on Drivers	Total Weight in Working Order	Tractive Power	Weight of Lightest Rail Advised	Radius of Sharpest Curve Advised	HAULING CAPACITY IN TONS OF 2,000 POUNDS (EXCLUSIVE OF LOCOMOTIVE AND TENDER)						
	Inches	Inches	Feet and Inches	Feet and Inches	Gallons	Pounds	Pounds	Pounds	Per Yard	Feet	ON LEVEL	ON GRADES OF					
												½%	1%	1½%	2%	2½%	3%
*Almendrero	16x24	46	9-0	24-3	2,500	74,000	101,000	18,700	45	160	2,790	1,050	620	430	320	250	200
*Almendrica	17x24	46	9-6	25-6	3,000	84,000	114,000	21,100	50	175	3,145	1,185	700	485	360	280	225
*Almendron	18x24	46	9-6	25-9	3,500	96,000	128,000	23,700	55	175	3,545	1,335	790	545	405	315	255
*Almendruco	19x24	46	10-0	26-9	4,000	107,000	141,000	26,400	60	200	3,945	1,485	880	610	455	355	285

The above figures for Hauling Capacity are based on a frictional resistance of $6\frac{1}{2}$ pounds per ton of 2,000 pounds. Where track and cars are in poor condition, the resistance will be greatly increased. In such cases, therefore, allowance should be made for actual Hauling Capacities, considerably less than those given in the table.

* Built for 4 feet, $8\frac{1}{2}$ inch gauge.

AMERICAN LOCOMOTIVE COMPANY

Conditions and Requirements of Service

REQUESTS FOR PROPOSITIONS SHOULD GIVE AS MUCH OF THE FOLLOWING INFORMATION AS POSSIBLE

Gauge of track.....	Radius of sharpest curve on this grade and length of curve on grade.....
Fuel.....	Radius of sharpest curve (on grade or level?), length of sharpest curve.....
Weight of rail per yard.....	Load to be started on level or grade; if on grade give description of it.....
Number of ties per mile, or spacing of ties center to center.....	Total length of run.....
Class of service.....	Distance between water stations.....
Number of loaded ears to be hauled each trip and weight of load for one ear.....	Limitations: height, width, length, total wheel base....
Number of empty ears to be hauled on return trip and weight of empty car.....	Preferred design if any.....
Steepest grade for loaded cars and length of grade.....	Kind of coupling and height from rail.....

If grades are numerous, a brief description of them should be given.

Metric Conversion Table

ARRANGED BY MR. C. W. HUNT, NEW YORK.

Millimetres $\times .03937$ = inches.	Litres $\div 28.316$ = cubic feet.
Millimetres $\div 25.4$ = inches.	Hectolitres $\times 3.531$ = cubic feet.
Centimetres $\times .3937$ = inches.	Hectolitres $\times 2.84$ = bushels (2150.42 cubic inches).
Centimetres $\div 2.54$ = inches.	Hectolitres $\times .131$ = cubic yards.
Metres $\times 39.37$ = inches (Act of Congress).	Hectolitres $\div 26.42$ = gallons (231 cubic inches).
Metres $\times 3.281$ = feet.	Grammes $\times 15.432$ = grains (Act of Congress).
Metres $\times 1.094$ = yards.	Grammes $\div 981.$ = dynes.
Kilometres $\times .621$ = miles.	Grammes (water) $\div 29.57$ = fluid ounces.
Kilometres $\div 1.6093$ = miles.	Grammes $\div 28.35$ = ounces avoirdupois.
Kilometres $\times 3280.7$ = feet.	Grammes per cubic centimetre $\div 27.7$ = pounds per cubic inch.
Square millimetres $\times .00155$ = sq. inches.	Joule $\times .7373$ = foot pounds.
Square millimetres $\div 645.1$ = sq. inches.	Kilogrammes $\times 2.2046$ = pounds
Square centimetres $\times .155$ = sq. inches.	Kilogrammes $\times 35.3$ = ounces avoirdupois.
Square centimetres $\div 6.451$ = sq. inches.	Kilogrammes $\div 1102.3$ = tons (2,000 lbs.)
Square metres $\times 10.764$ = sq. feet.	Kilogrammes per square centimetre $\times 14.223$ = lbs. per sq. in.
Square kilometres $\times 247.1$ = acres.	Kilogrammetres $\times 7.233$ = foot pounds.
Hectare $\times 2.471$ = acres.	Kilo per metre $\times .672$ = pounds per foot.
Cubic centimetres $\div 16.383$ = cubic inches.	Kilo per cubic metre $\times .062$ = pounds per cubic foot.
Cubic centimetres $\div 3.69$ = fl. drachms (U. S. P.)	Kilo per cheval $\times 2.235$ = pounds per horse-power.
Cubic centimetres $\div 29.57$ = fluid oz. (U. S. P.)	Kilo-Watts $\times 1.34$ = horse-power.
Cubic metres $\times 35.315$ = cubic feet.	Watts $\div 746.$ = horse-power.
Cubic metres $\times 1.308$ = cubic yards.	Watts $\div .7373$ = foot pounds per second.
Cubic metres $\times 264.2$ = gallons (231 cubic inches).	Calorie $\times 3.968$ = B. T. U.
Litres $\times 61.022$ = cubic inches (Act of Congress).	Cheval vapeur $\div .9863$ = horse-power
Litres $\times 33.84$ = fluid ounces (U. S. Phar.)	(Centigrade $\times 1.8$) + 32 = degree Fahrenheit.
Litres $\times .2642$ = gallons (231 cubic inches).	Franc $\times .193$ = dollars.
Litres $\div 3.78$ = gallons (231 cubic inches).	Gravity Paris = 980.94 centimetres per sec.

Tractive Power

The tractive power of the different classes of locomotives given in the tables is calculated on the basis of a speed not exceeding ten miles per hour and a mean effective pressure in the cylinders of 85 per cent. of the boiler pressure. It is the maximum tractive power of the locomotive and is calculated by the following formula:

$$T. P. = \frac{d^2 \times L \times (0.85 \times B)}{D}$$

T. P. = tractive power.

d = diameter of cylinders, in inches.

L = length of stroke, in inches.

B = boiler pressure, in pounds per square inch.

D = diameter of driving wheels, in inches.

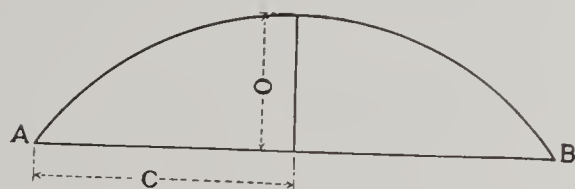
By this formula, a locomotive with cylinders 14 inches diameter, 22 inches stroke, 150 pounds boiler pressure and 44 inch driving wheels, would have a tractive power of:

$$\frac{14 \times 14 \times 22 \times (0.85 \times 150)}{44} = 12,495 \text{ pounds.}$$

Method of Determining the Radius of a Curve

When the radius of a curve is not known, the following simple method of determining it is given:

With a string or straight-edge, connect any two points on the curve—such as A and B in the diagram.



Measure the distance from either point to the center of the line, corresponding to the distance C on the diagram. Then from the center of the line measure the distance at right angles to the line from it to the rail, corresponding to the distance O in the diagram. The measurements from the center of the line to the rail must be taken from the same part of the rail—that is, the flange or head, as the case may be—that the ends of the line are touching. These measurements having been obtained, the radius of the curve is found by the formula:

$$\frac{O^2 + C^2}{2 \times O} = \text{Radius}$$

This formula may be simply stated as follows:

Multiply the distance C in inches by itself. Then multiply the distance O in inches by itself, and divide the sum of the products by twice the distance O in inches. The answer will be the radius of the curve in inches. If the measurement is taken on the inside of the outer rail, one-half the distance between rails should be deducted from the calculated radius, as the radius of a curve is understood to be measured on the center line of the track.

To insure against any error in the measurements due to irregularities in the tracks, it is always better to take measurements from several parts of the curve.

When the radius of the curve is given in feet and is required to be converted to degrees, the formula is:

$$D = \frac{5730}{R}$$

D=curvature, in degrees.

R=radius of curve, in feet.

AMERICAN LOCOMOTIVE COMPANY

Table of Curve Ordinates (in inches)

Curves Degrees	Radius Feet	LENGTH OF CHORD—FEET						Curves Degrees	Radius Feet	LENGTH OF CHORD—FEET					
		30	28	26	24	22	20			30	28	26	24	22	20
0 20	17189.00	.08	.07	.06	.05	.04	.03	30 00	194.00	7.08	6.12	5.28	4.56	3.84	3.12
0 40	8594.00	.16	.14	.12	.10	.08	.07	31 00	188.00	7.32	6.36	5.52	4.68	3.96	3.24
1 00	5730.00	.24	.20	.18	.15	.13	.10	32 00	182.00	7.56	6.60	5.68	4.80	4.08	3.36
1 20	4297.00	.31	.27	.23	.20	.17	.13	33 00	176.00	7.80	6.78	5.88	4.96	4.20	3.48
1 40	3438.00	.39	.34	.29	.25	.21	.17	34 00	171.00	7.96	6.96	6.06	5.12	4.32	3.60
2 00	2865.00	.47	.41	.35	.30	.25	.20	35 00	167.00	8.16	7.20	6.20	5.28	4.44	3.69
2 20	2456.00	.55	.48	.41	.35	.29	.23	36 00	162.00	8.40	7.34	6.34	5.40	4.56	3.78
2 40	2149.00	.63	.55	.47	.40	.33	.27	37 00	158.00	8.64	7.48	6.50	5.52	4.68	3.86
3 00	1910.00	.71	.62	.53	.45	.38	.31	38 00	154.00	8.88	7.70	6.68	5.68	4.80	3.96
3 20	1719.00	.78	.68	.59	.50	.42	.35	39 00	150.00	9.12	7.92	6.84	5.86	4.92	4.08
3 40	1563.00	.86	.75	.65	.55	.46	.38	40 00	147.00	9.36	8.10	7.00	6.00	5.04	4.16
4 00	1433.00	.94	.82	.71	.60	.50	.42	41 00	143.00	9.60	8.28	7.20	6.12	5.16	4.27
4 20	1323.00	1.02	.89	.77	.65	.55	.45	42 00	140.00	9.82	8.52	7.36	6.24	5.28	4.38
4 40	1226.00	1.10	.96	.83	.70	.59	.48	43 00	137.00	10.04	8.72	7.52	6.38	5.40	4.49
5 00	1146.00	1.18	1.03	.89	.75	.68	.52	44 00	134.00	10.32	8.88	7.68	6.56	5.52	4.58
6 00	955.00	1.41	1.23	1.06	.90	.76	.62	45 00	131.00	10.50	9.08	7.82	6.72	5.64	4.67
7 00	819.00	1.65	1.44	1.24	1.05	.89	.73	46 00	128.00	10.68	9.28	7.96	6.84	5.76	4.76
8 00	717.00	1.88	1.64	1.42	1.20	1.01	.84	47 00	126.00	10.90	9.48	8.18	6.96	5.88	4.85
9 00	637.00	2.12	1.84	1.60	1.35	1.14	.94	48 00	123.00	11.08	9.70	8.36	7.08	6.00	4.94
10 00	574.00	2.36	2.05	1.78	1.50	1.27	1.04	49 00	121.00	11.30	9.86	8.52	7.24	6.12	5.04
11 00	522.00	2.50	2.26	1.95	1.65	1.39	1.15	50 00	119.00	11.52	10.04	8.68	7.40	6.24	5.13
12 00	478.00	2.83	2.47	2.15	1.81	1.54	1.26	51 00	117.00	11.76	10.20	8.86	7.56	6.36	5.22
13 00	442.00	3.05	2.66	2.30	1.96	1.66	1.36	52 00	115.00	11.92	10.38	9.04	7.68	6.48	5.31
14 00	410.00	3.30	2.87	2.48	2.10	1.78	1.46	53 00	113.00	12.14	10.56	9.18	7.80	6.60	5.40
15 00	383.00	3.54	3.08	2.68	2.26	1.91	1.57	54 00	111.00	12.36	10.80	9.34	7.92	6.72	5.52
16 00	359.00	3.76	3.28	2.83	2.40	2.04	1.67	55 00	109.00	12.60	10.98	9.48	8.04	6.80	5.62
17 00	338.00	4.00	3.48	3.02	2.57	2.16	1.78	56 00	107.00	12.84	11.18	9.64	8.16	6.88	5.72
18 00	320.00	4.21	3.67	3.18	2.70	2.28	1.87	57 00	105.00	13.08	11.38	9.82	8.30	6.96	5.82
19 00	303.00	4.45	3.89	3.36	2.86	2.41	1.98	58 00	104.00	13.22	11.56	9.96	8.48	7.08	5.92
20 00	288.00	4.70	4.09	3.55	3.00	2.54	2.09	59 00	102.00	13.44	11.74	10.08	8.64	7.20	6.02
21 00	274.00	4.92	4.28	3.71	3.14	2.66	2.18	60 00	100.00	13.68	11.90	10.20	8.76	7.32	6.12
22 00	262.00	5.16	4.44	3.84	3.30	2.80	2.29	61 00	98.51	13.80	12.00	10.32	8.88	7.44	6.12
23 00	251.00	5.40	4.68	4.06	3.44	2.92	2.39	62 00	97.08	14.04	12.12	10.44	9.00	7.56	6.24
24 00	241.00	5.64	4.92	4.20	3.59	3.04	2.50	63 00	95.69	14.16	12.36	10.68	9.12	7.68	6.36
25 00	231.00	5.83	5.09	4.40	3.73	3.16	2.59	64 00	94.35	14.40	12.60	10.80	9.24	7.80	6.48
26 00	222.00	6.07	5.29	4.58	3.88	3.29	2.70	65 00	93.06	14.64	12.72	10.92	9.36	7.80	6.48
27 00	214.00	6.29	5.48	4.75	4.02	3.41	2.80	66 00	91.80	14.88	12.84	11.16	9.48	7.92	6.60
28 00	207.00	6.54	5.70	4.93	4.18	3.53	2.90	67 00	90.59	15.00	13.08	11.28	9.60	8.04	6.60
29 00	200.00	6.77	5.89	5.09	4.33	3.64	3.00	68 00	89.41	15.24	13.32	11.40	9.72	8.16	6.72

AMERICAN LOCOMOTIVE COMPANY
Table of Curve Ordinates (in inches)

Curves Degrees	Radius Feet	LENGTH OF CHORD—FEET						Curves Degrees	Radius Feet	LENGTH OF CHORD—FEET					
		30	28	26	24	22	20			30	28	26	24	22	20
69 00	88.27	15.48	13.44	11.52	9.84	8.28	6.84	100 00	65.27	21.00	18.24	15.56	13.44	11.04	9.36
70 00	87.17	15.60	13.56	11.76	9.96	8.40	6.84	101 00	64.79	21.12	18.48	15.84	13.56	11.40	9.36
71 00	86.10	15.84	13.80	11.88	10.08	8.52	6.96	102 00	64.47	21.24	18.48	15.96	13.56	11.40	9.48
72 00	85.06	15.96	13.92	12.00	10.20	8.52	7.08	103 00	63.88	21.48	18.72	16.08	13.68	11.52	9.48
73 00	84.06	16.20	14.16	12.12	10.32	8.64	7.20	104 00	63.45	21.60	18.84	16.20	13.80	11.64	9.60
74 00	83.08	16.32	14.28	12.24	10.44	8.76	7.20	105 00	63.02	21.72	18.96	16.32	13.92	11.64	9.60
75 00	82.13	16.56	14.40	12.48	10.56	8.88	7.32	106 00	62.60	21.96	19.08	16.44	14.04	11.76	9.72
76 00	81.20	16.80	14.64	12.60	10.68	9.00	7.44	107 00	62.19	22.08	19.20	16.56	14.04	11.76	9.72
77 00	80.32	16.92	14.76	12.72	10.80	9.12	7.56	108 00	61.80	22.20	19.32	16.56	14.16	11.88	9.84
78 00	79.45	17.16	14.88	12.84	10.92	9.24	7.56	109 00	61.41	22.32	19.44	16.68	14.28	11.88	9.84
79 00	78.60	17.28	15.12	13.08	11.04	9.24	7.56	110 00	61.04	22.56	19.56	16.92	14.40	12.00	9.96
80 00	77.78	17.52	15.36	13.20	11.28	9.48	7.80	111 00	60.67	22.68	19.68	16.92	14.40	12.00	9.96
81 00	76.93	17.76	15.48	13.32	11.40	9.48	7.80	112 00	60.32	22.80	19.80	17.04	14.52	12.12	10.08
82 00	76.21	17.88	15.60	13.44	11.40	9.60	7.92	113 00	59.96	22.92	19.92	17.16	14.64	12.24	10.08
83 00	75.47	18.12	15.72	13.56	11.52	9.72	8.04	114 00	59.62	23.04	20.04	17.28	14.64	12.36	10.20
84 00	74.72	18.24	15.84	13.68	11.64	9.72	8.04	115 00	59.28	23.16	20.16	17.28	14.76	12.36	10.20
85 00	74.00	18.48	16.08	13.92	11.76	9.96	8.16	116 00	58.96	23.28	20.28	17.40	14.88	12.48	10.32
86 00	73.31	18.60	16.20	14.04	11.88	10.08	8.28	117 00	58.64	23.40	20.40	17.52	14.88	12.60	10.32
87 00	72.64	18.84	16.32	14.16	12.00	10.08	8.28	118 00	58.33	23.52	20.52	17.64	15.00	12.60	10.44
88 00	72.10	18.96	16.44	14.16	12.12	10.20	8.40	119 00	58.03	23.64	20.64	17.76	15.12	12.72	10.44
89 00	71.33	19.08	16.68	14.40	12.24	10.32	8.52	120 00	57.73	23.76	20.76	17.76	15.12	12.72	10.44
90 00	70.71	19.32	16.80	14.52	12.24	10.32	8.52	121 00	57.38	24.00	20.88	17.88	15.24	12.84	10.56
91 00	70.10	19.44	16.92	14.52	12.48	10.44	8.52	122 00	57.17	24.00	20.88	18.00	15.36	12.84	10.56
92 00	69.51	19.68	17.16	14.76	12.60	10.56	8.64	123 00	56.89	24.24	21.00	18.12	15.36	12.96	10.68
93 00	68.93	19.80	17.28	14.88	12.72	10.68	8.76	124 00	56.63	24.36	21.12	18.12	15.48	12.96	10.68
94 00	68.37	19.92	17.40	15.00	12.84	10.68	8.76	125 00	56.36	24.48	21.24	18.24	15.60	13.08	10.80
95 00	67.81	20.16	17.52	15.00	12.84	10.80	8.88	126 00	56.11	24.48	21.36	18.36	15.60	13.08	10.80
96 00	67.28	20.28	17.76	15.24	12.96	10.92	9.00	127 00	55.87	24.60	21.48	18.48	15.72	13.20	10.80
97 00	66.75	20.52	17.88	15.36	13.08	10.92	9.00	128 00	55.63	24.72	21.48	18.48	15.72	13.20	10.92
98 00	66.25	20.64	18.00	15.48	13.20	11.04	9.12	129 00	55.39	24.84	21.60	18.60	15.84	13.32	10.92
99 00	65.75	20.76	18.12	15.60	13.20	11.16	9.24	130 00	55.17	24.96	21.72	18.72	15.84	13.32	10.92

Weight that Rail will Carry

It may be assumed that the maximum load that light steel rails will carry, with crossties properly spaced, is 250 pounds on a wheel for each pound weight of rail per yard, for rails weighing less than 40 pounds per yard, and 300 pounds, for rails weighing from 40 to 60 pounds per yard. Under these conditions, a four-wheel locomotive weighing 32,000 pounds on driving wheels would have 8,000 pounds on each wheel and would require a rail weighing 32 pounds per yard.

The same weight of rail would carry, in a locomotive having six driving wheels or bearing points on the rail, a weight of 48,000 pounds; or, assuming that the six-wheel locomotive weighed the same as the four-wheel locomotive (32,000 pounds), a rail weighing 21 pounds per yard would be sufficient. It is desirable, however, when practicable, that the rail should exceed the calculated weights to avoid possible deflection of the rail, which would increase the resistance and reduce the hauling capacity of the locomotive.

AMERICAN LOCOMOTIVE COMPANY

Comparison of Different Methods of Designating the Same Grade

PER CENT. OF GRADE				GRADE IN FEET PER MILE	PER CENT. OF GRADE	GRADE IN FEET PER MILE
$\frac{1}{8}$ of 1 per cent.	or $1\frac{1}{2}$ inches per 100 feet	=	6.6 feet per mile		$4\frac{1}{2}$ per cent or 4 feet 6 inches per 100 feet	=237.6 feet per mile
$\frac{1}{4}$ " 1 "	" 3 " 100 "	=	13.2 " "		$4\frac{3}{4}$ " " 4 " 9 " 100 "	=250.8 " "
$\frac{1}{2}$ " 1 "	" 6 " 100 "	=	26.4 " "		5 " " 5 " 0 " 100 "	=264.0 " "
$\frac{3}{4}$ " 1 "	" 9 " 100 "	=	39.6 " "		$5\frac{1}{4}$ " " 5 " 3 " 100 "	=277.2 " "
1 " or 1 foot 0 "	" " 100 "	=	52.8 " "		$5\frac{1}{2}$ " " 5 " 6 " 100 "	=290.4 " "
$1\frac{1}{4}$ " " 1 " 3 "	" " 100 "	=	66.0 " "		$5\frac{3}{4}$ " " 5 " 9 " 100 "	=303.6 " "
$1\frac{1}{2}$ " " 1 " 6 "	" " 100 "	=	79.2 " "		6 " " 6 " 0 " 100 "	=316.8 " "
$1\frac{3}{4}$ " " 1 " 9 "	" " 100 "	=	92.4 " "		$6\frac{1}{4}$ " " 6 " 3 " 100 "	=330.0 " "
2 " " 2 feet 0 "	" " 100 "	=	105.6 " "		$6\frac{1}{2}$ " " 6 " 6 " 100 "	=343.2 " "
$2\frac{1}{4}$ " " 2 " 3 "	" " 100 "	=	118.8 " "		$6\frac{3}{4}$ " " 6 " 9 " 100 "	=356.4 " "
$2\frac{1}{2}$ " " 2 " 6 "	" " 100 "	=	132.0 " "		7 " " 7 " 0 " 100 "	=369.6 " "
$2\frac{3}{4}$ " " 2 " 9 "	" " 100 "	=	145.2 " "		$7\frac{1}{2}$ " " 7 " 6 " 100 "	=396.0 " "
3 " " 3 " 0 "	" " 100 "	=	158.4 " "		8 " " 8 " 0 " 100 "	=422.4 " "
$3\frac{1}{4}$ " " 3 " 3 "	" " 100 "	=	171.6 " "		$8\frac{1}{2}$ " " 8 " 6 " 100 "	=448.8 " "
$3\frac{1}{2}$ " " 3 " 6 "	" " 100 "	=	184.8 " "		9 " " 9 " 0 " 100 "	=475.2 " "
$3\frac{3}{4}$ " " 3 " 9 "	" " 100 "	=	198.0 " "		$9\frac{1}{2}$ " " 9 " 6 " 100 "	=501.6 " "
4 " " 4 " 0 "	" " 100 "	=	211.2 " "		10 " " 10 " 0 " 100 "	=528.0 " "
$4\frac{1}{4}$ " " 4 " 3 "	" " 100 "	=	224.4 " "			

AMERICAN LOCOMOTIVE COMPANY

Classification of Locomotives

[WHYTE'S SYSTEM]

040		4 WHEEL
060		6 WHEEL
0440		ARTICULATED
0660		ARTICULATED
2440		ARTICULATED
080		8 WHEEL
240		4 COUPLED
260		MOGUL
280		CONSOLIDATION
2100		DECAPOD
440		8 WHEEL
460		10 "
480		12 "
042		4 COUPLED & TRAILING
062		6 " " "
082		8 " " "
044		FORNEY 4 COUPLED
064		FORNEY 6 COUPLED
046		" 4 "
066		" 6 "
242		COLUMBIA
262		PRAIRIE
282		8 COUPLED
2102		10 "
244		4 "
264		6 "
284		8 "
246		4 "
266		6 "
442		ATLANTIC
462		PACIFIC
444		4 COUPLED DOUBLE ENDER
464		6 " " "
446		4 " " "

The locomotive classification adopted by the American Locomotive Company is based on the representation by numerals of the number and arrangement of the wheels commencing at the front. Thus, a Mogul locomotive with a two-wheel leading truck, six driving wheels and no trailing truck, would be classified as a 260 type.

The total weight is expressed in 1,000 of pounds. For example, an Atlantic locomotive weighing 176,000 pounds would be classified as a 442-176 type. If the engine is compound, the letter C should be substituted for the dash; thus, 442 C 176 type. If tanks are used in place of a separate tender, the letter T should be used in place of the dash. Thus a double-end suburban locomotive with two-wheeled leading truck, six drivers and six-wheeled rear truck, weighing 214,000 pounds, would be a 266 T 214 type.

Electric Motor and Trailer Trucks

FOR ALL CLASSES OF SERVICE

10032



BUILT BY

American Locomotive Company

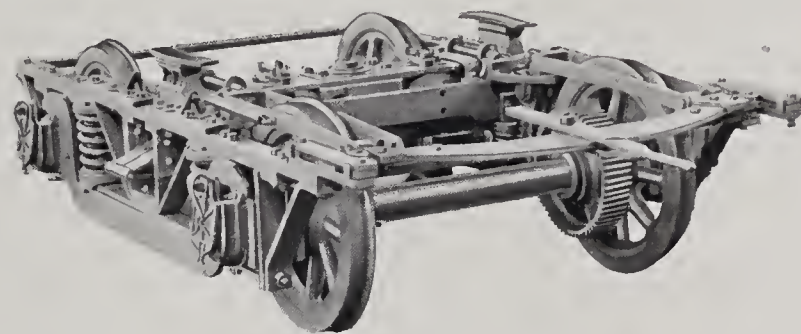
30 CHURCH STREET, NEW YORK CITY

CABLE ADDRESS "LOCOMOTIVE NEWYORK"

[The Code Word for this Pamphlet is "CALECANDAM"]

AMERICAN LOCOMOTIVE COMPANY

101



Electric Motor and Trailer Trucks



BECAUSE of the increased weight of cars and motors and the higher speed requirements, the engineering problems to be solved in the design of trucks for modern street and inter-urban railway service are the same as those met with in the design of steam railroad trucks. To successfully solve these problems, therefore, it is necessary to apply to the design and construction of electric trucks the principles of steam railroad practice.

The motor truck to-day combines all functions of both locomotive driving-wheels and locomotive truck wheels, and the important principles entering into motor truck construction are, therefore, recognized and appreciated best by those having had a wide experience in the construction and maintenance of locomotives. To meet the severe requirements of modern electric traction service, the designer must consider the steam locomotive as a precedent, bearing in mind that, combined with strength and rigidity, the electric truck must also possess the essential characteristic of perfect riding qualities.

In developing the designs illustrated in the following pages, this company has applied the experience of over seventy years in mechanical construction in connection with equipment designed and built for the severest service requirements, and combined with this an equal number of years of car experience which has developed the successful principles of the Master Car Builders truck. In the designs presented it will be found that all the features of the Master Car Builders trucks, which go to insure easy riding qualities, are embodied; while the construction is also in accord with the best locomotive building practice.

AMERICAN LOCOMOTIVE COMPANY

Our standard types of motor trucks (pages 8 to 29) are recommended to meet the ordinary conditions of electric traction service, both freight and passenger. These include trucks suitable for inside and outside hung motors, with floating and swinging bolsters, and for carrying capacities up to 60,000 pounds.

Special designs built to meet particular conditions or to conform to requirements and specifications submitted by the railroad companies are shown on pages 32 to 50.

A special chapter is also devoted to motor trucks for electric locomotives. The essential characteristics of an electric locomotive truck are strength, rigidity and simplicity; and the designs illustrated will be found to conform to the most approved steam locomotive practice.

All our trucks are constructed in accordance with the best locomotive building practice; all bolt holes through frames being reamed and bolts tapered for driving fit, all bent parts of frames made to dies and formers, and all wearing parts machined.

By the use of gauges and templets like parts of trucks of the same type are interchangeable.

On pages 110 to 113 will be found the material specifications which have been adopted as standard by this company after long experience in steam locomotive construction, and to which all the material entering into the construction of our trucks will conform, unless otherwise specified by the purchaser.

Any of the designs shown in the following pages may be modified to suit particular conditions or railroad companies' preferences; and this company is prepared to submit drawings and specifications for building electric motor and trailer trucks for all classes and conditions of service, either from its own designs or in accordance with designs and ideas submitted by the railroad companies.

AMERICAN LOCOMOTIVE COMPANY

Motor Truck Classification

In the electric motor truck classification adopted by this company, the letters of the alphabet are used to designate the various standard types as given below, the letter "Z" indicating a special design to meet railroad company's specifications.

TYPE			
"A"	Two-bar Equalizer	Solid Frame	Swinging Bolster
"B"	Two-bar Equalizer	Angle End Frame	Swinging Bolster
"K"	Short Wheel Base	Bar Frame	Swinging Bolster
"P"	Arch Bar Frame	Motor Inside	Floating Bolster
"R"	Arch Bar Frame	Motor Outside	Floating Bolster
"Z"	Special Design.		

The carrying capacity at the center plate is designated by the figures 2, 3, 4, 5, etc.

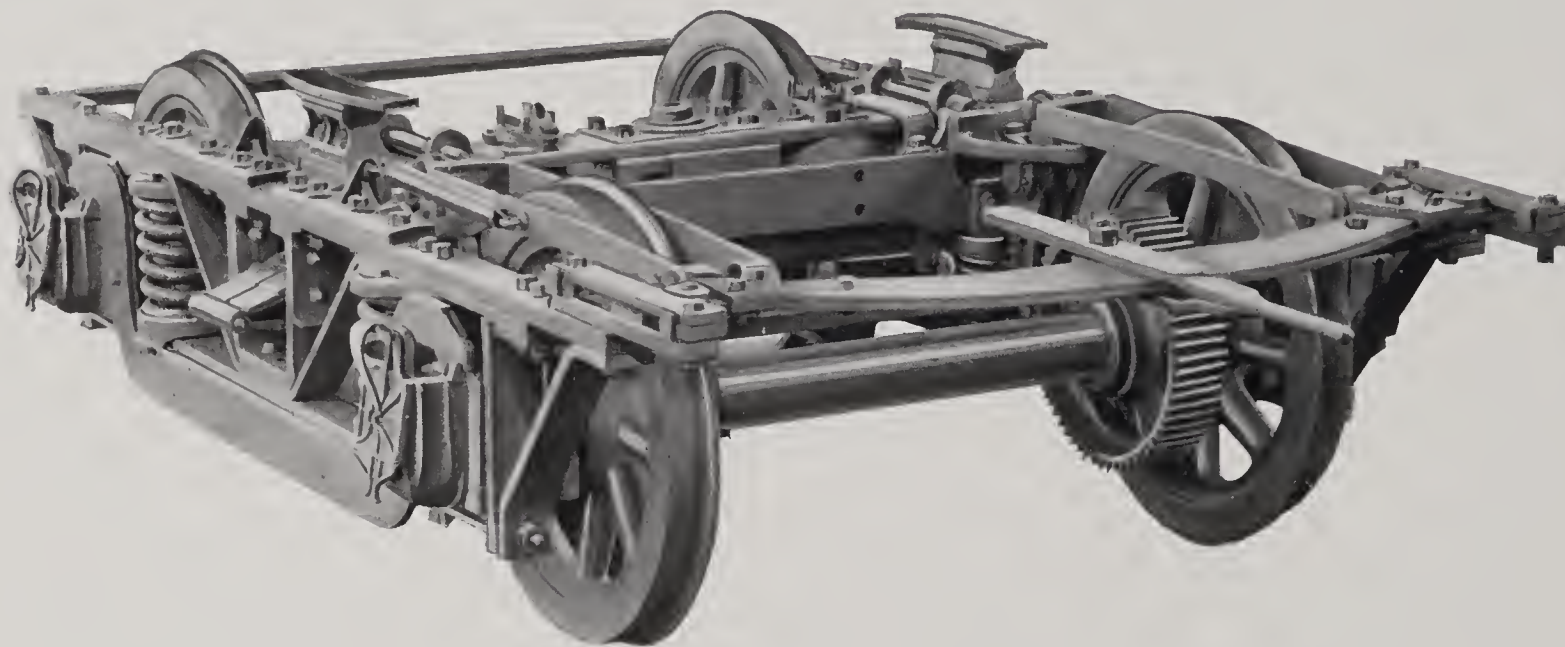
The figures in each case represent multiples of 10,000 pounds; and the maximum and minimum capacity in each case is 5,000 pounds more or less than the figure given, the only change in the trucks being in the carrying capacity of the springs.

Thus, for instance, "2" would represent a carrying capacity at the center plate ranging from 15,000 to 25,000 pounds. The wheel base is designated by inches. For example: Type A-378 would indicate a two-bar equalizer, solid frame, swinging bolster truck with a carrying capacity ranging from 25,000 to 35,000 pounds and a wheel base 78 inches long.

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American Locomotive Company's
Standard Motor Trucks

AMERICAN LOCOMOTIVE COMPANY



TYPE "A" MOTOR TRUCK

BUILT FOR HUDSON VALLEY RAILWAY COMPANY, GLENS FALLS, N. Y.

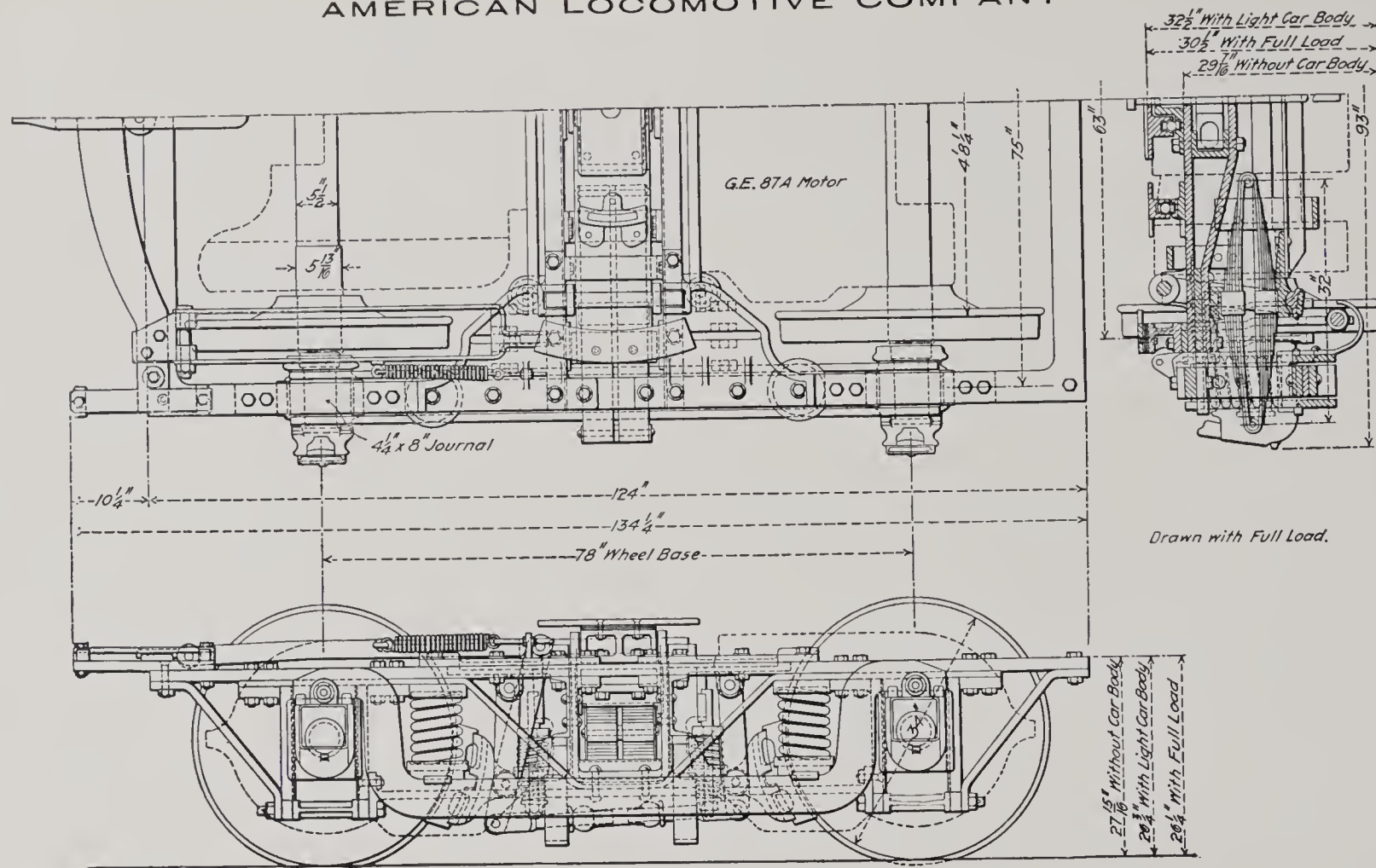
Type "A" High Speed Electric Motor Truck

This type of truck has been developed to meet the most severe requirements of high speed electric street and interurban railway service. It is suitable for motors suspended inside of axles and may be built to any track gauge with wheel base to suit motors, and for carrying capacities at the center plate up to 60,000 pounds.

This type is built with solid wrought iron top frame, channel iron transoms, cast steel transom gussets, swinging bolsters of the built up or cast steel types and two-bar equalizers. The transom gusset castings include brake hanger lugs, bearings for swing link pins and brake release spring brackets, thus reducing the number of parts to a minimum. The swinging bolster is carried on either double or triple elliptic springs, as the load may require, while coil springs carry the weight on the truck on the two-bar equalizers. Wear or rubbing pieces between bolster and transom prevent the bolster from cramping and transmit the strains on the bolster through the transom to the truck side frames, without interfering with the free action of the bolster and springs. The transom channels are carried by shoulders provided on the frame center braces, thus reducing the shear on the bolts or rivets through brace and transom. All brake lever holes and hanger pins are designed to provide large bearings and are case hardened.

The design throughout has been developed with a view toward strength, stiffness, simplicity and perfect riding qualities.

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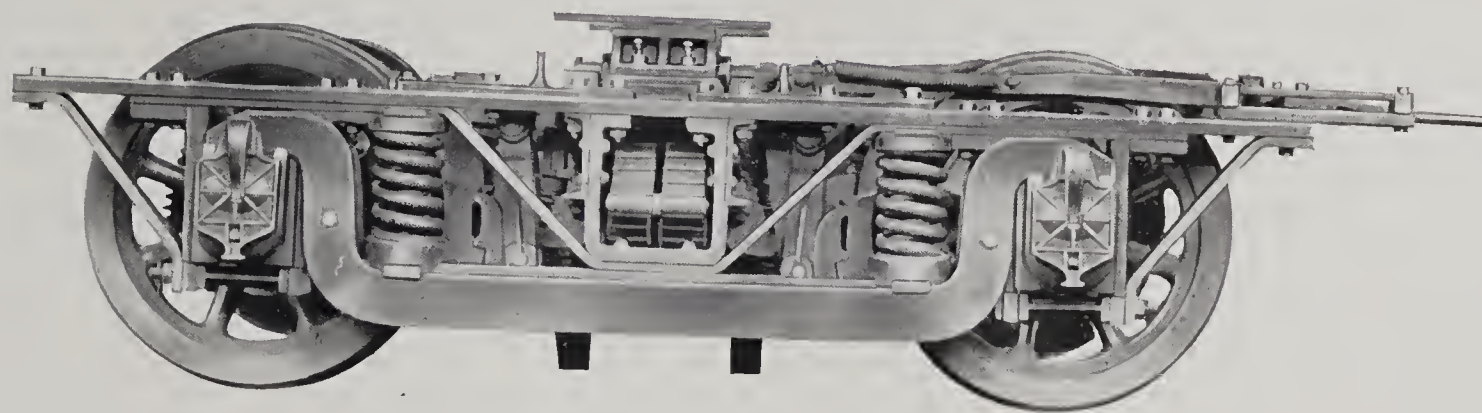


TYPE A-378 MOTOR TRUCK

BUILT FOR HUDSON VALLEY RAILWAY COMPANY, GLENS FALLS, N. Y.

Gauge of Track . . .	4 feet 8 1/2 inches	Load carried at Center Plate	21,000 pounds	Wheels	34 inches, diameter
Wheel Base	6 feet 6 inches	Weight without Motors, Wheels or Axles	7,000 pounds	Axles	5 1/2 inches, diameter
Total Length	10 feet 4 inches	Weight complete, without Motors	10,500 pounds	Journals	4 1/4 x 8 inches

AMERICAN LOCOMOTIVE COMPANY



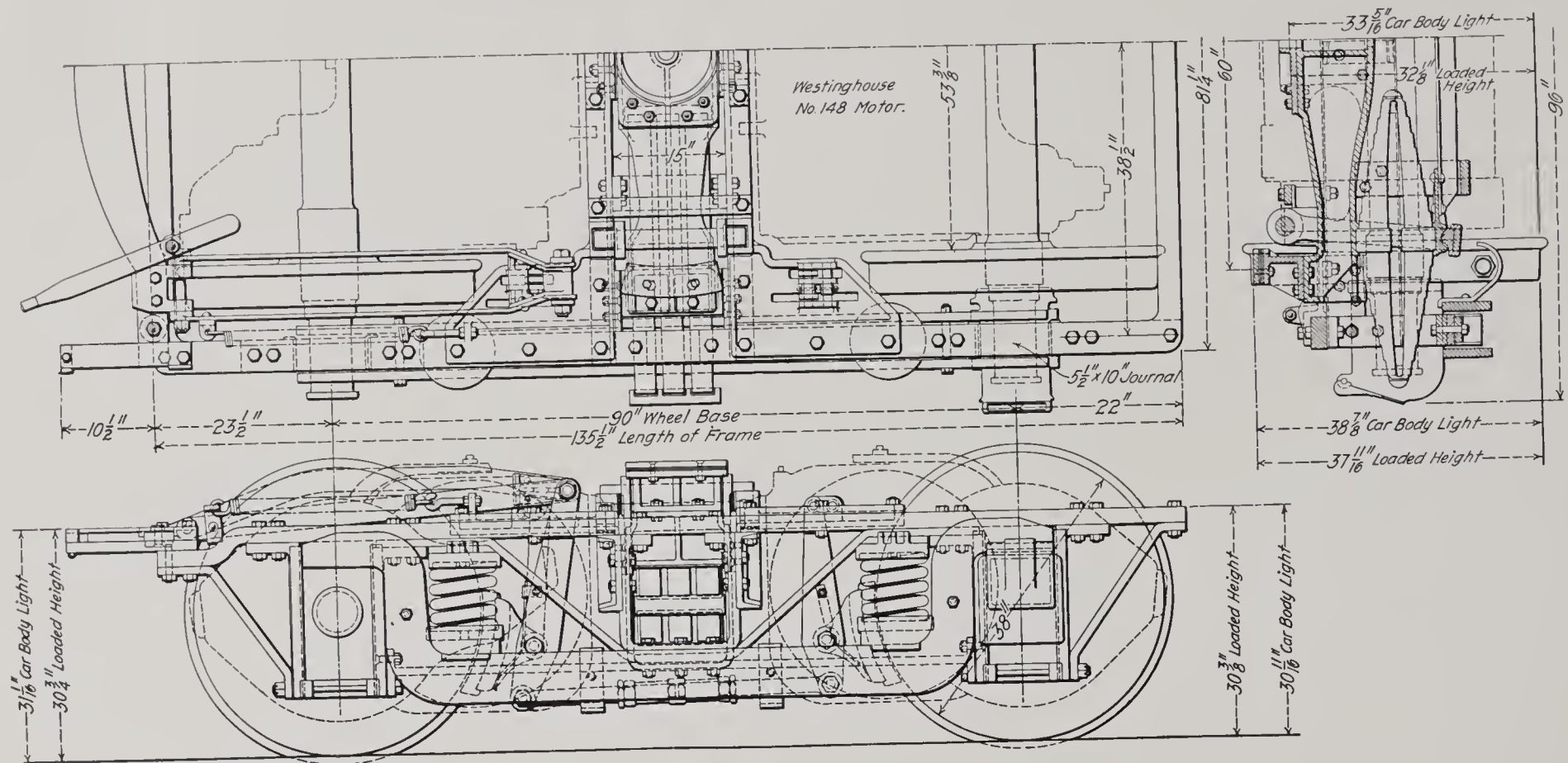
TYPE A-378 MOTOR TRUCK

BUILT FOR HUDSON VALLEY RAILWAY COMPANY, GLENS FALLS, N. Y.

CODE WORD "ALMQUIST"

This truck was also built for the Eastern Ohio Traction Company, Cleveland, Ohio

AMERICAN LOCOMOTIVE COMPANY

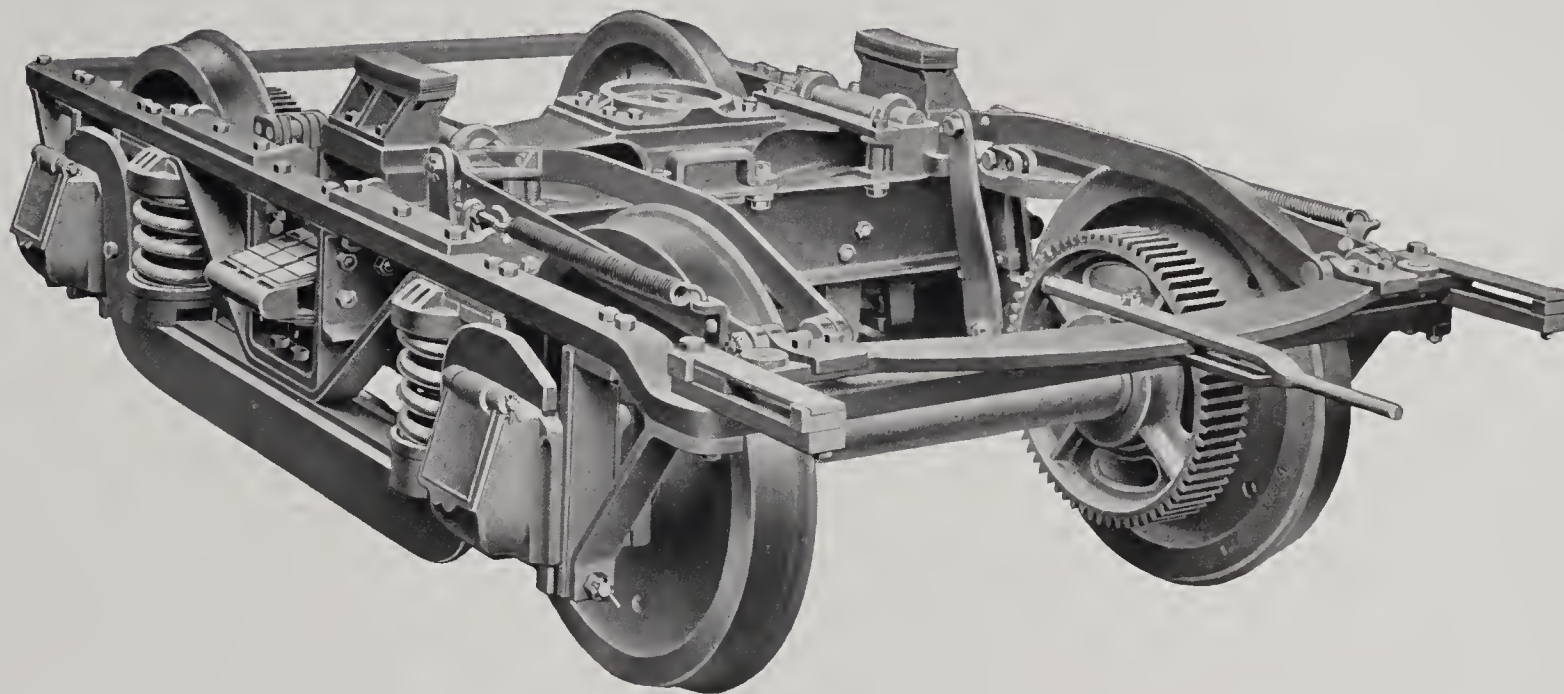


TYPE A-490 MOTOR TRUCK

BUILT FOR DENVER & INTERURBAN RAILROAD, DENVER, COLO.

Gauge of Track	4 feet 8 1/2 inches	Load carried at Center Plate	38,000 pounds	Wheels	38 inches, diameter
Wheel Base	7 feet 6 inches	Weight without Motors, Wheels or Axles	8,500 pounds	Axles	6 1/2 inches, diameter
Total Length	11 feet 3 1/2 inches	Weight complete, without Motors	13,900 pounds	Journals	5 1/2 x 10 inches

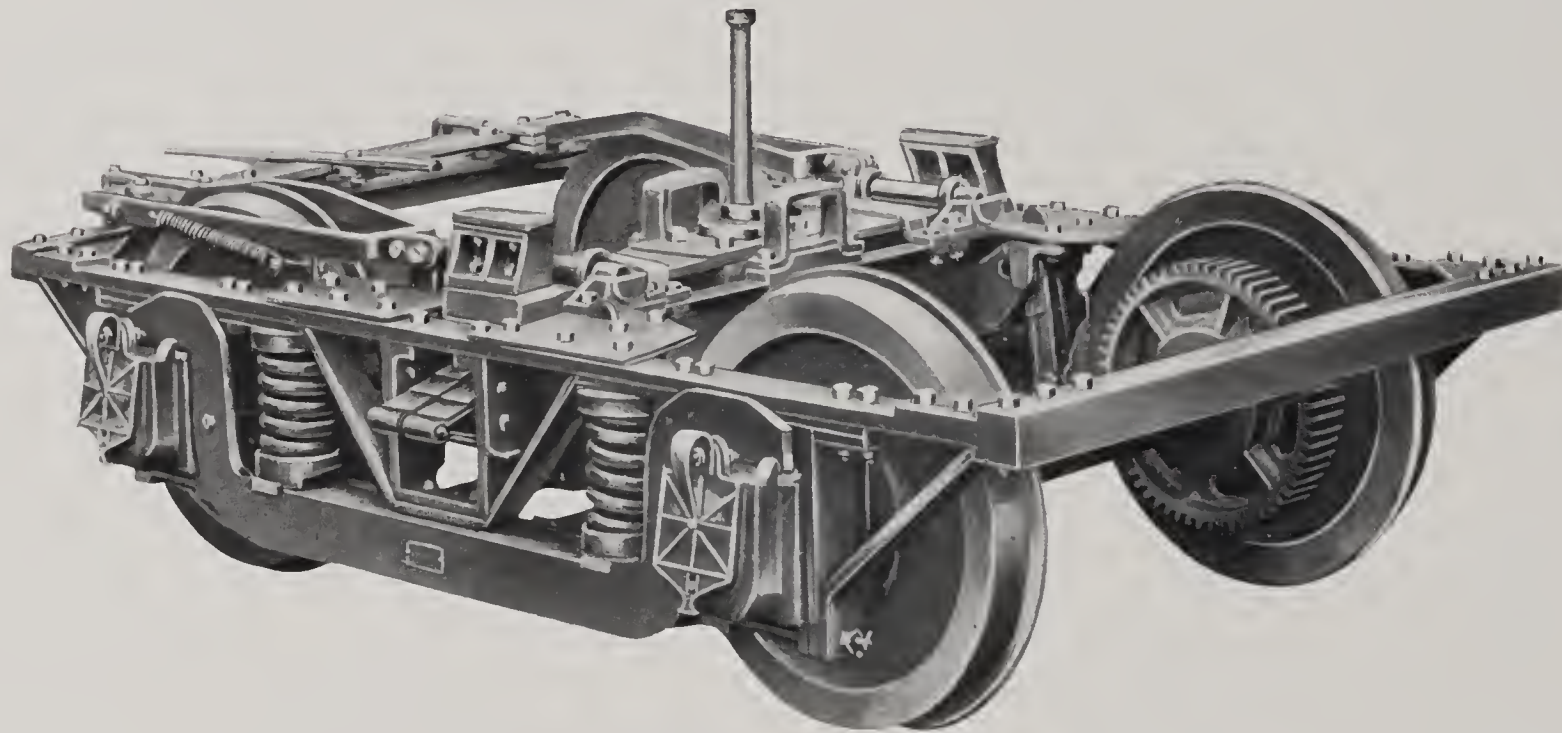
AMERICAN LOCOMOTIVE COMPANY



TYPE A-490 MOTOR TRUCK
BUILT FOR DENVER & INTERURBAN RAILROAD, DENVER, COLO.

CODE WORD "ALMRY"

AMERICAN LOCOMOTIVE COMPANY



TYPE "B" MOTOR TRUCK

BUILT FOR THE MARYLAND ELECTRIC RAILWAYS, BALTIMORE, MD.

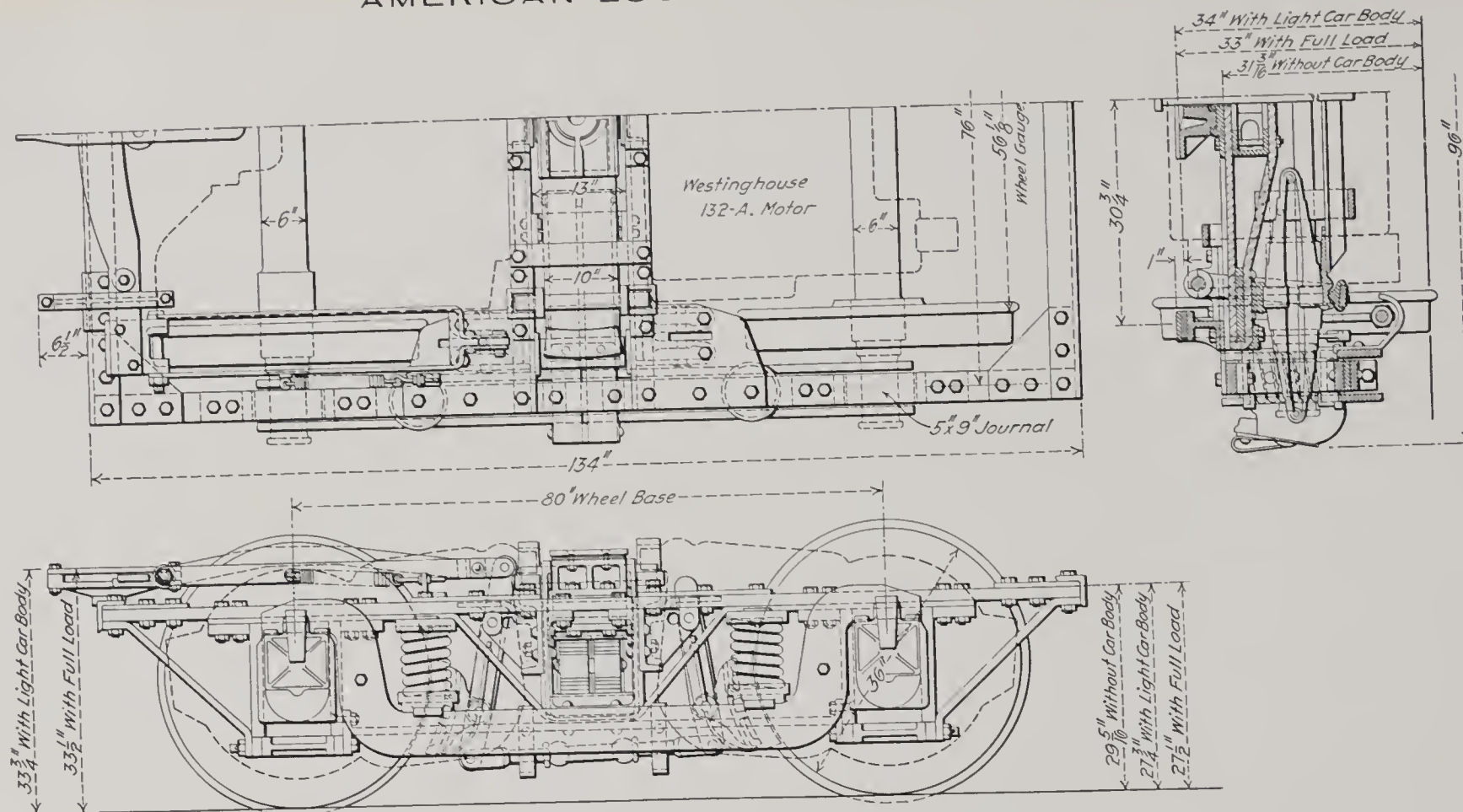
Type "B" High Speed Electric Motor Truck

Our standard type "B" electric motor truck for high speed service is, in general, similar to our standard type "A," but differs somewhat in structural features. It is suitable for motors that may be suspended inside of axles and may be built to any track gauge with wheel base to suit motors, and for carrying capacities at center plate up to 60,000 pounds.

The principal difference in design between this and our type "A" two-bar equalizer truck is in the frame construction. The top frame is made of wrought iron bars tied together at ends by heavy angles and reinforced at corners with plate steel gussets. Plate steel gussets are also used to tie frame and steel channel transoms; or, if desired, cast steel transom gussets may be used.

All the features of design and construction, which insure strength, stiffness and easy riding qualities in our type "A" truck, are embodied in this design; while at the same time the frame construction presents certain advantages as regards facility of repairs over the solid frame.

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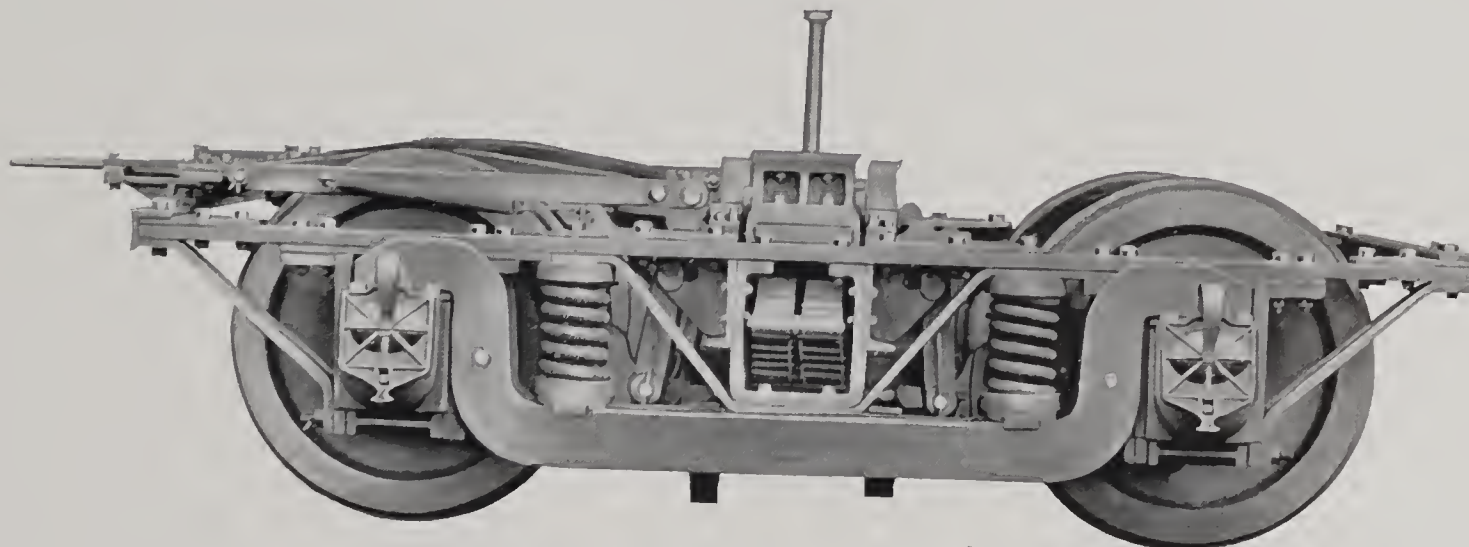


TYPE B-380 MOTOR TRUCK

BUILT FOR THE MARYLAND ELECTRIC RAILWAYS, BALTIMORE, MD.

Gauge of Track	4 feet 8 1/2 inches	Load carried at Center Plate	32,500 pounds	Wheels	36 inches, diameter
Wheel Base	6 feet 8 inches	Weight without Motors, Wheels or Axles	7,000 pounds	Axles	6 inches, diameter
Total Length	11 feet 2 inches	Weight complete, without Motors	13,000 pounds	Journals	5 x 9 inches

AMERICAN LOCOMOTIVE COMPANY

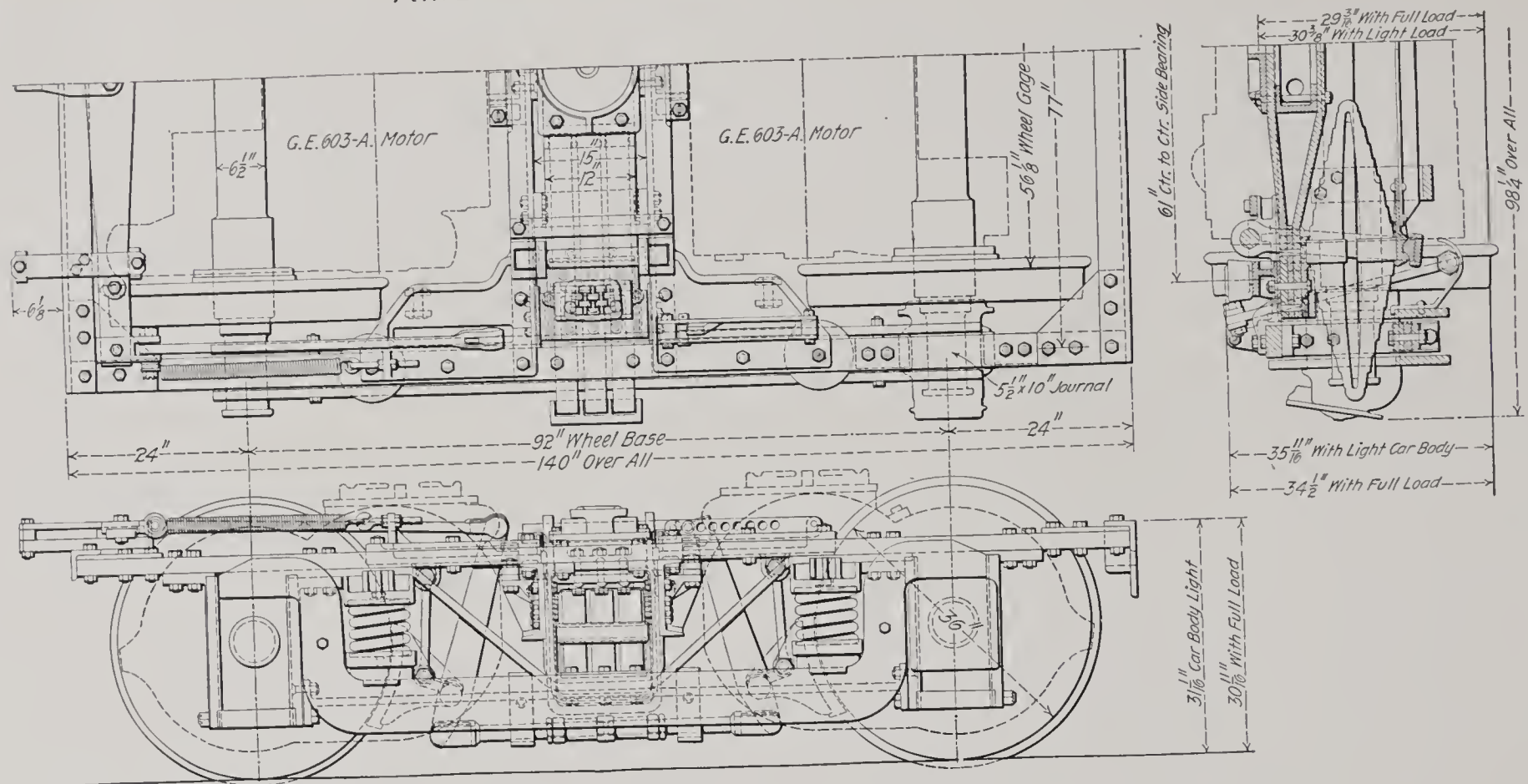


TYPE B-380 MOTOR TRUCK

BUILT FOR THE MARYLAND ELECTRIC RAILWAYS, BALTIMORE, MD.

CODE WORD "ALMSGIVER"

AMERICAN LOCOMOTIVE COMPANY

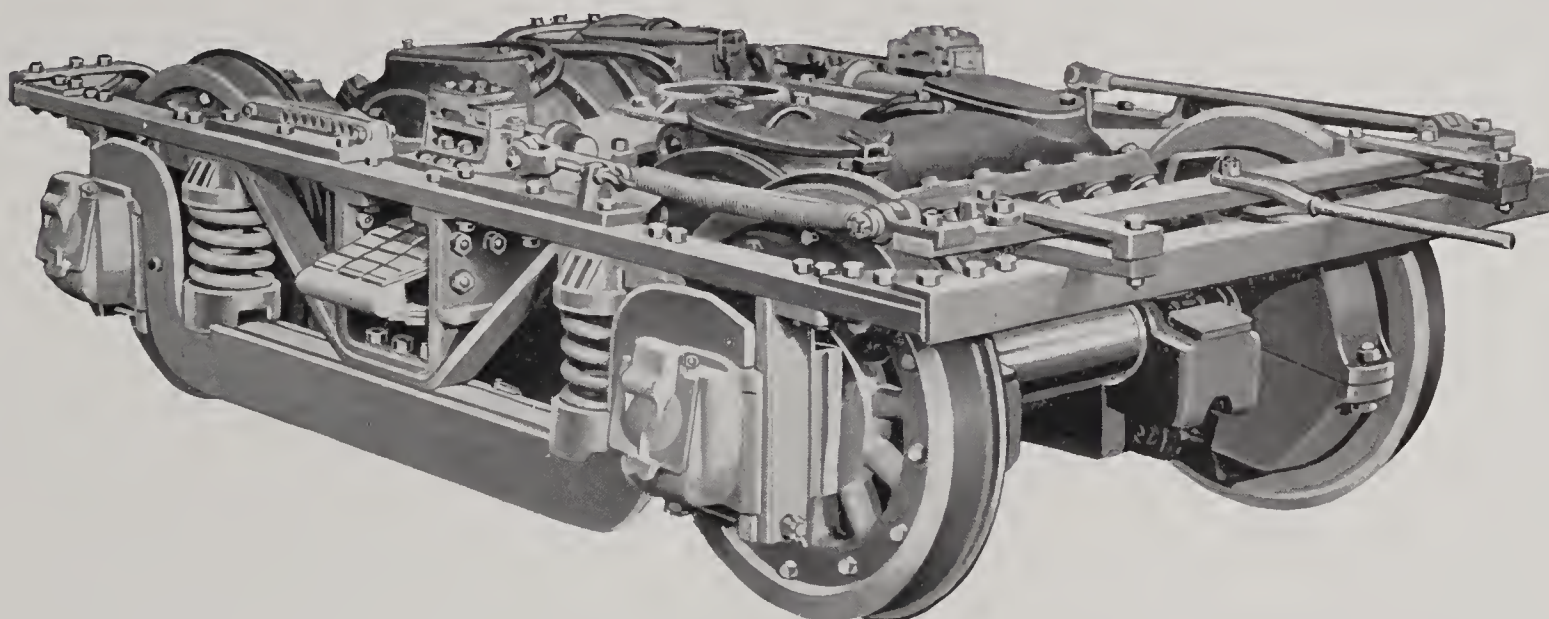


TYPE B-592 MOTOR TRUCK

BUILT FOR NEW YORK, NEW HAVEN & HARTFORD RAILROAD, NEW HAVEN, CONN.

Gauge of Track . . . 4 feet 8 1/2 inches	Load carried at Center Plate 53,250 pounds	Wheels . . . 36 inches, diameter
Wheel Base . . . 7 feet 8 inches	Weight without Motors, Wheels or Axles 8,600 pounds	Axles . . . 6 1/2 inches, diameter
Total Length . . . 11 feet 8 inches	Weight complete, without Motors 14,900 pounds	Journals . . . 5 1/2 x 10 inches

AMERICAN LOCOMOTIVE COMPANY

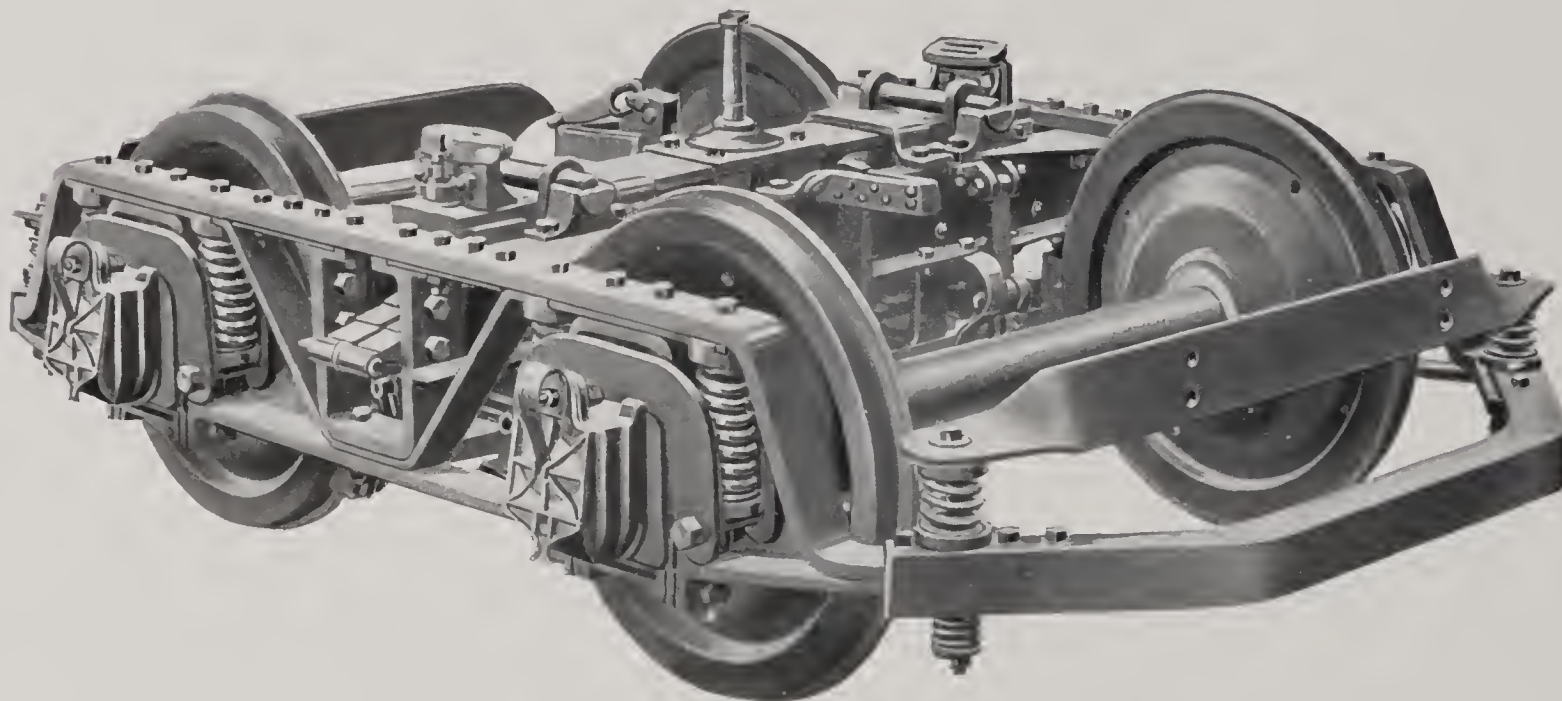


TYPE B-592 MOTOR TRUCK

BUILT FOR NEW YORK, NEW HAVEN & HARTFORD RAILROAD, NEW HAVEN, CONN.

CODE WORD "ALMSGIVING"

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AMERICAN LOCOMOTIVE COMPANY



TYPE "K" MOTOR TRUCK

BUILT FOR PEOPLE'S RAILWAY COMPANY DAYTON, OHIO

Type "K" Short Wheel Base Electric Motor Truck

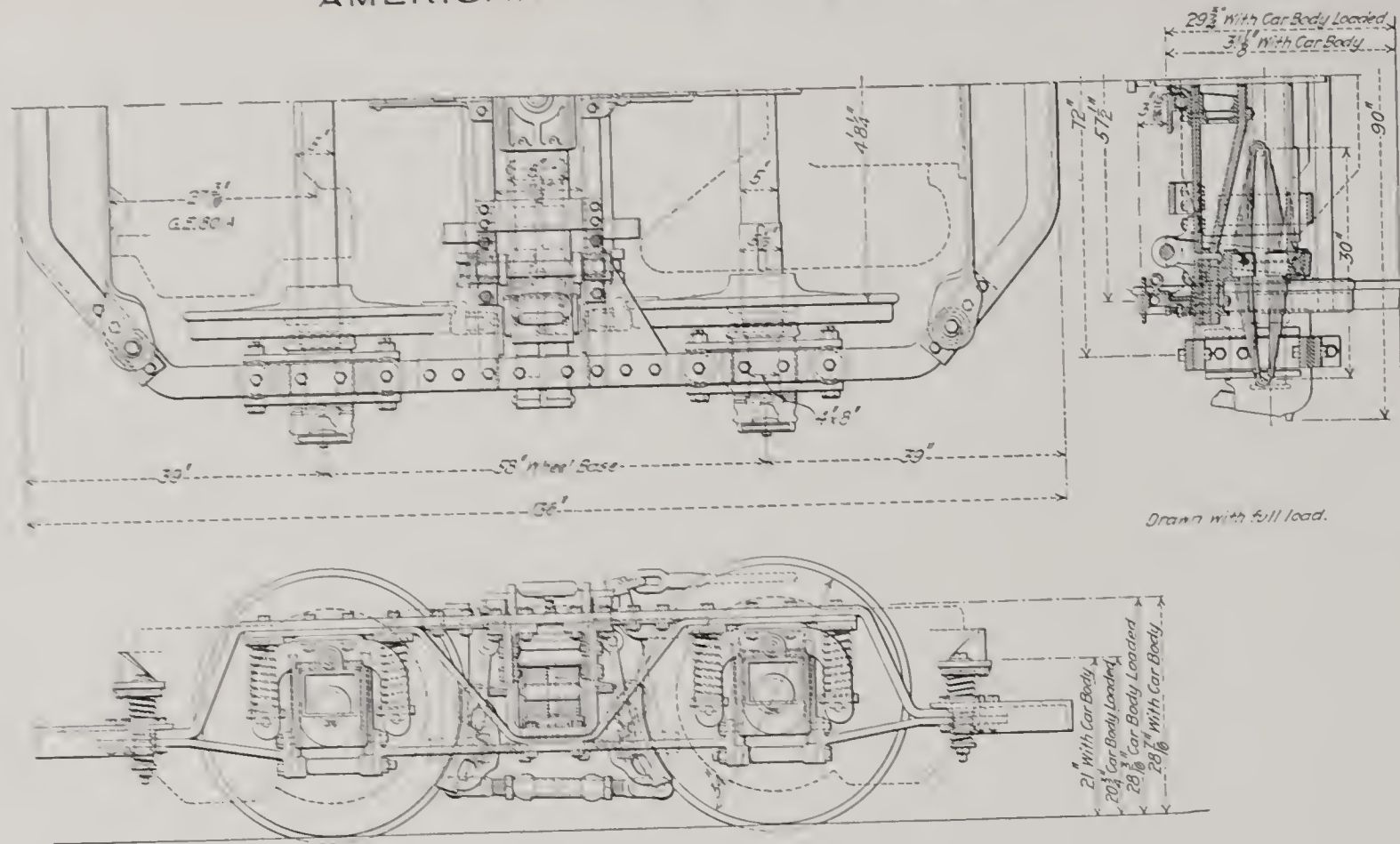
Our standard type "K" electric motor truck is particularly adapted to meet the requirements of service on curves of very small radius. This type of truck is suitable for all motors that may be suspended outside of axles; and may be built for any track gauge, with a minimum wheel base of 4 feet 4 inches, and for carrying capacities at center plate ranging from 12,000 to 35,000 pounds.

The bolsters are of the swinging type carried on double elliptic springs carefully designed to suit variations in load, ample allowance being made for the side thrust of bolsters in operation on short curves.

The transoms are of steel channels securely bolted to the frame center braces and further supported by shoulders on the braces, thus reducing the shear on the bolts or rivets through brace and transom. Wear or rubbing pieces between bolster and transoms prevent the bolster from cramping and transmit the strains on the bolster through the transoms to the truck side frames, without interfering with the free action of the bolster. Steel plate or cast steel gussets are used to brace side frames and transoms. Shock absorbing springs are provided which carry the side frames and load on the journal boxes by means of wrought iron yokes or equalizers over the top of the journal box, two springs being used at each pedestal.

These features of design insure a truck in which strength, stiffness and simplicity are combined with perfect riding qualities.

AMERICAN LOCOMOTIVE COMPANY

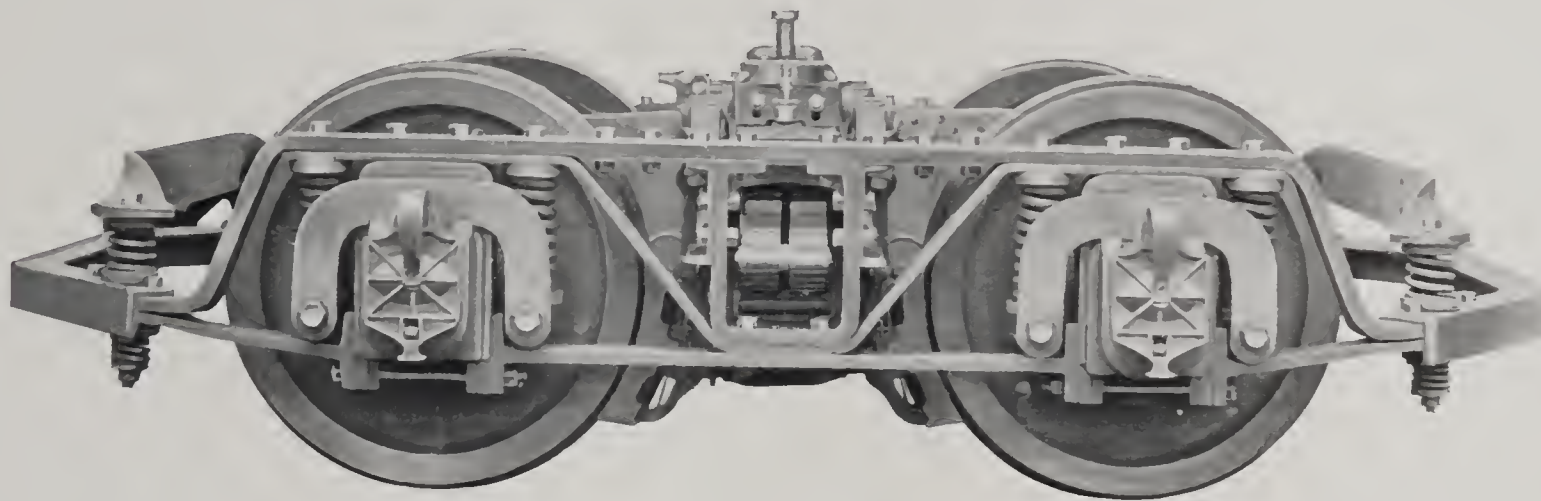


TYPE K-258 MOTOR TRUCK

BUILT FOR PEOPLE'S RAILWAY COMPANY, DAYTON, OHIO

Gauge of Track	4 feet 8 1/2 inches	Load carried at Center Plate	18,000 pounds	Wheels	34 inches, diameter
Wheel Base	4 feet 10 inches	Weight without Motors, Wheels or Axles	4,100 pounds	Axles	5 inches, diameter
Total Length	11 feet 4 inches	Weight complete, without Motors	7,900 pounds	Journals	4 x 8 inches

AMERICAN LOCOMOTIVE COMPANY



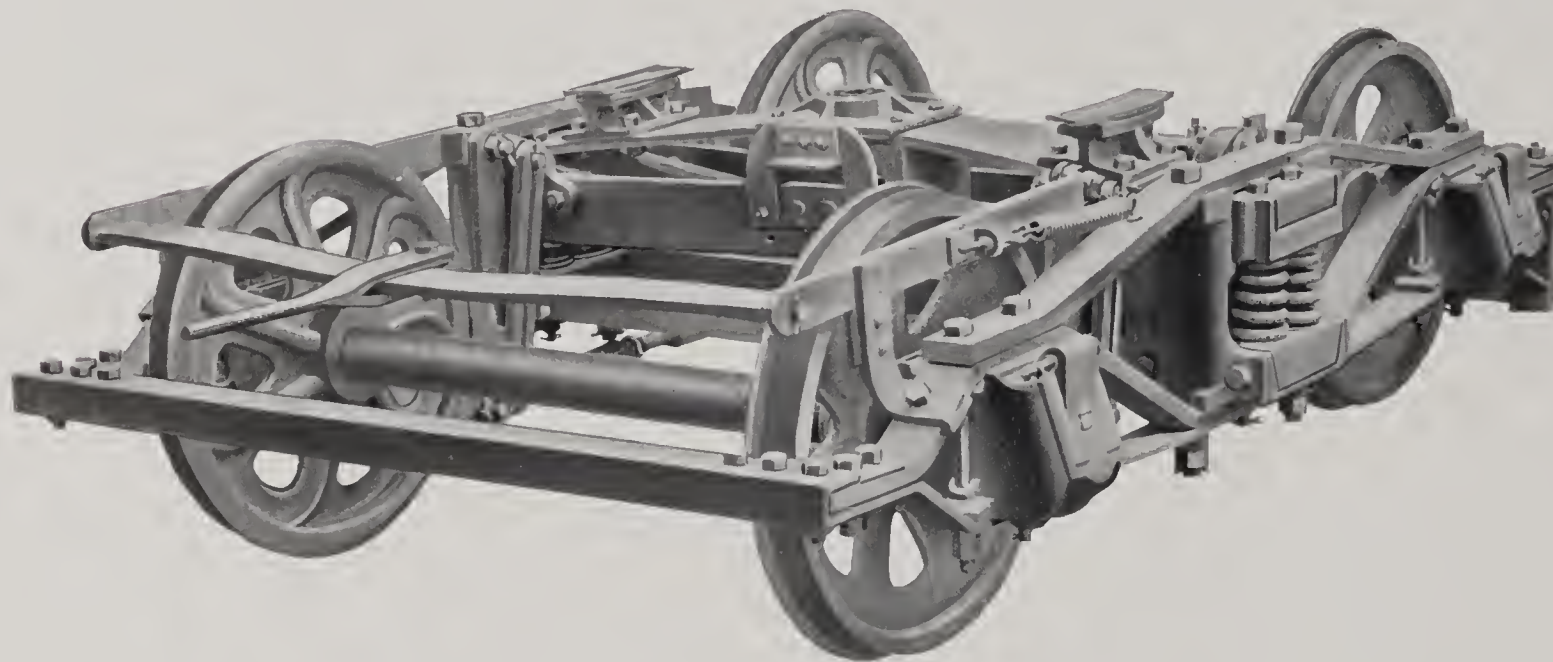
TYPE K-258 MOTOR TRUCK

BUILT FOR PEOPLE'S RAILWAY COMPANY, DAYTON, OHIO

CODE WORD "ALMUZZAM"

This truck was also built for Springfield Railway Company, Springfield, Ohio

AMERICAN LOCOMOTIVE COMPANY



TYPE ' P ' MOTOR TRUCK

BUILT FOR SCHENECTADY RAILWAY COMPANY, SCHENECTADY, N. Y.

AMERICAN LOCOMOTIVE COMPANY

Type "P" Arch Bar Frame Electric Motor Truck

This type of truck is particularly adapted to meet the requirements of freight or express service. It is suitable for motors that may be suspended inside of axles and may be built for any track gauge, with a minimum wheel base of 6 feet, and for carrying capacities at center plate up to 40,000 pounds.

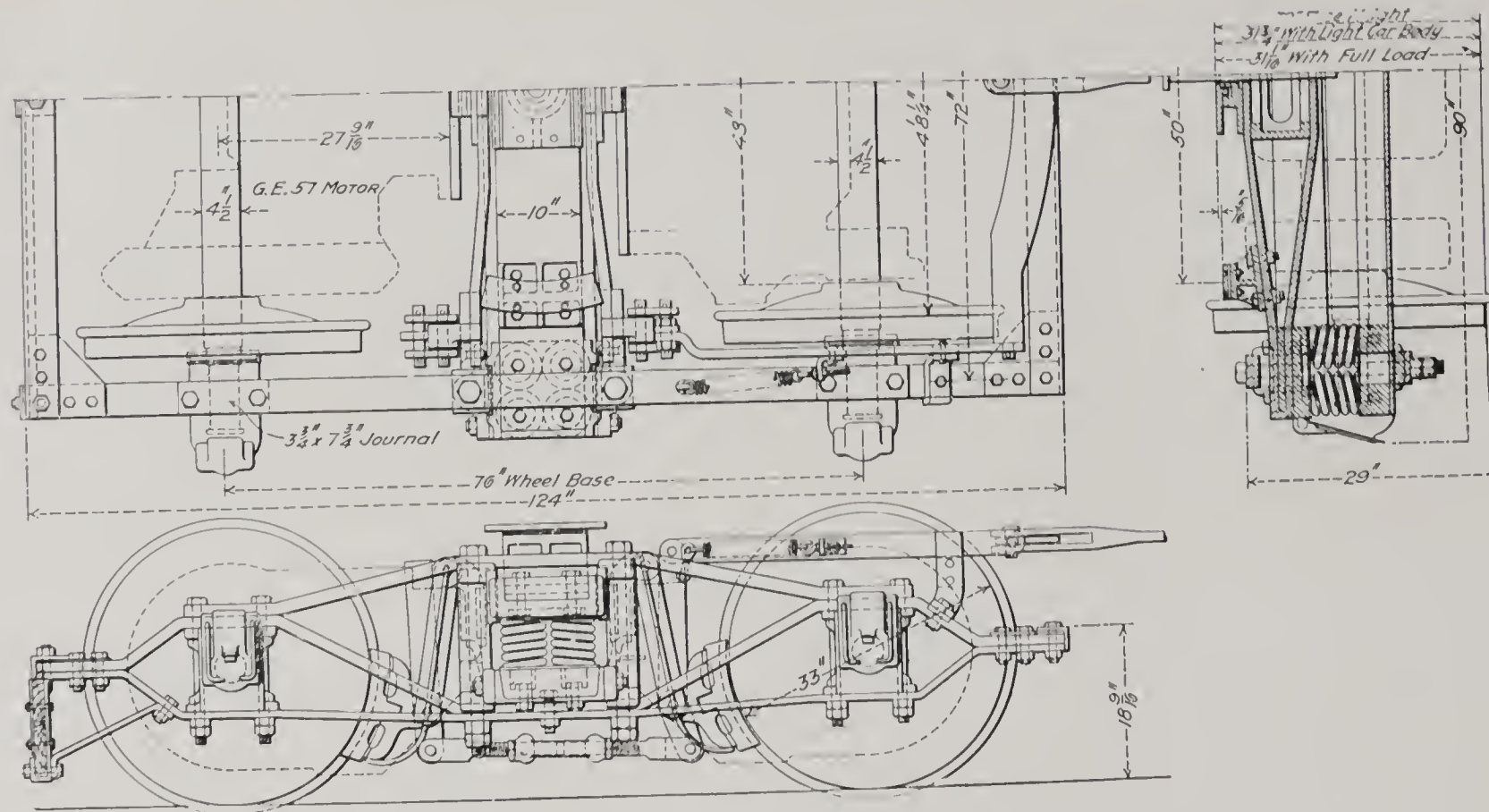
The bolster is of the floating type resting on nests of four coil springs at each end and carried on a heavy channel iron spring plank, extending across and securely bolted to the side frames and to lugs on the cast iron bolster guide columns. The bolster guides at each end of the bolster are provided with lips either side of the columns, thus allowing the bolster to ride freely on the springs and at the same time keeping it in perfect alignment with the truck frame and axles.

The transoms, which are wrought iron bars, are carried on shoulders cast on the guide columns to which they are bolted; and carry the motor suspension as well as brake hanger brackets.

The journal boxes are securely bolted to the arch bars and bottom tie bar, in accordance with M.C.B. standard practice; and the ends of the bottom arch bar and tie bar are extended beyond the wheels to receive the angle iron end frame and are securely bolted to it with steel plate corner gussets.

The design throughout has been developed with a view toward strength, stiffness and simplicity, with all parts easy of access and a minimum number of wearing parts.

AMERICAN LOCOMOTIVE COMPANY

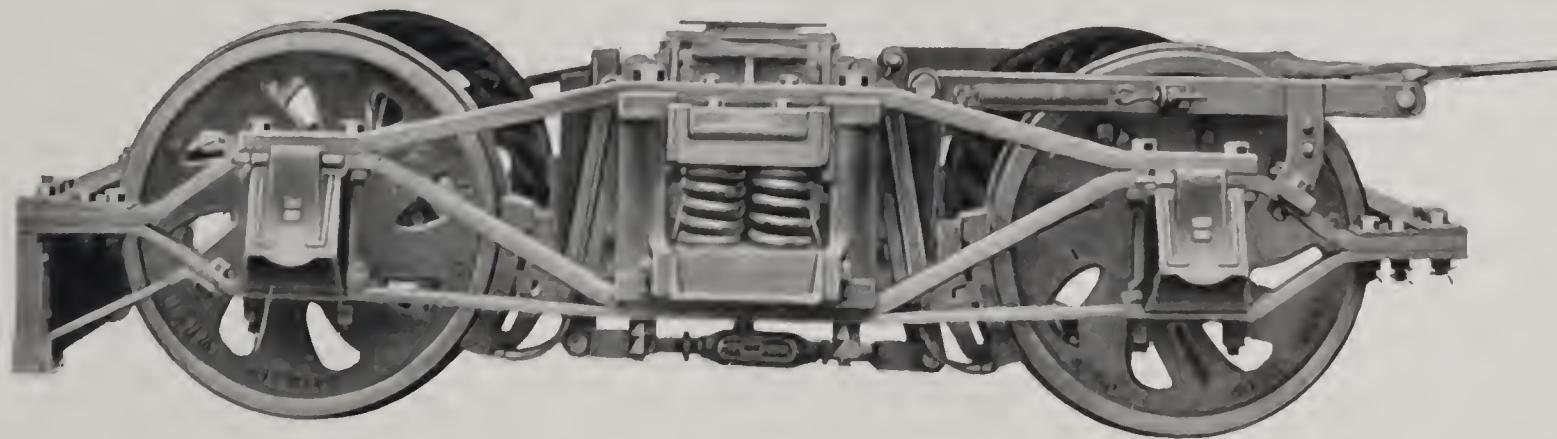


TYPE P-376 MOTOR TRUCK

BUILT FOR SCHENECTADY RAILWAY COMPANY, SCHENECTADY, N. Y.

Gauge of Track	4 feet 8 1/2 inches	Load carried at Center Plate	28,000 pounds	Wheels	33 inches, diameter
Wheel Base	6 feet 4 inches	Weight without Motors, Wheels or Axles	4,800 pounds	Axles	5 inches, diameter
Total Length	10 feet 4 inches	Weight complete, without Motors	7,200 pounds	Journals	4 1/4 x 8 inches

AMERICAN LOCOMOTIVE COMPANY

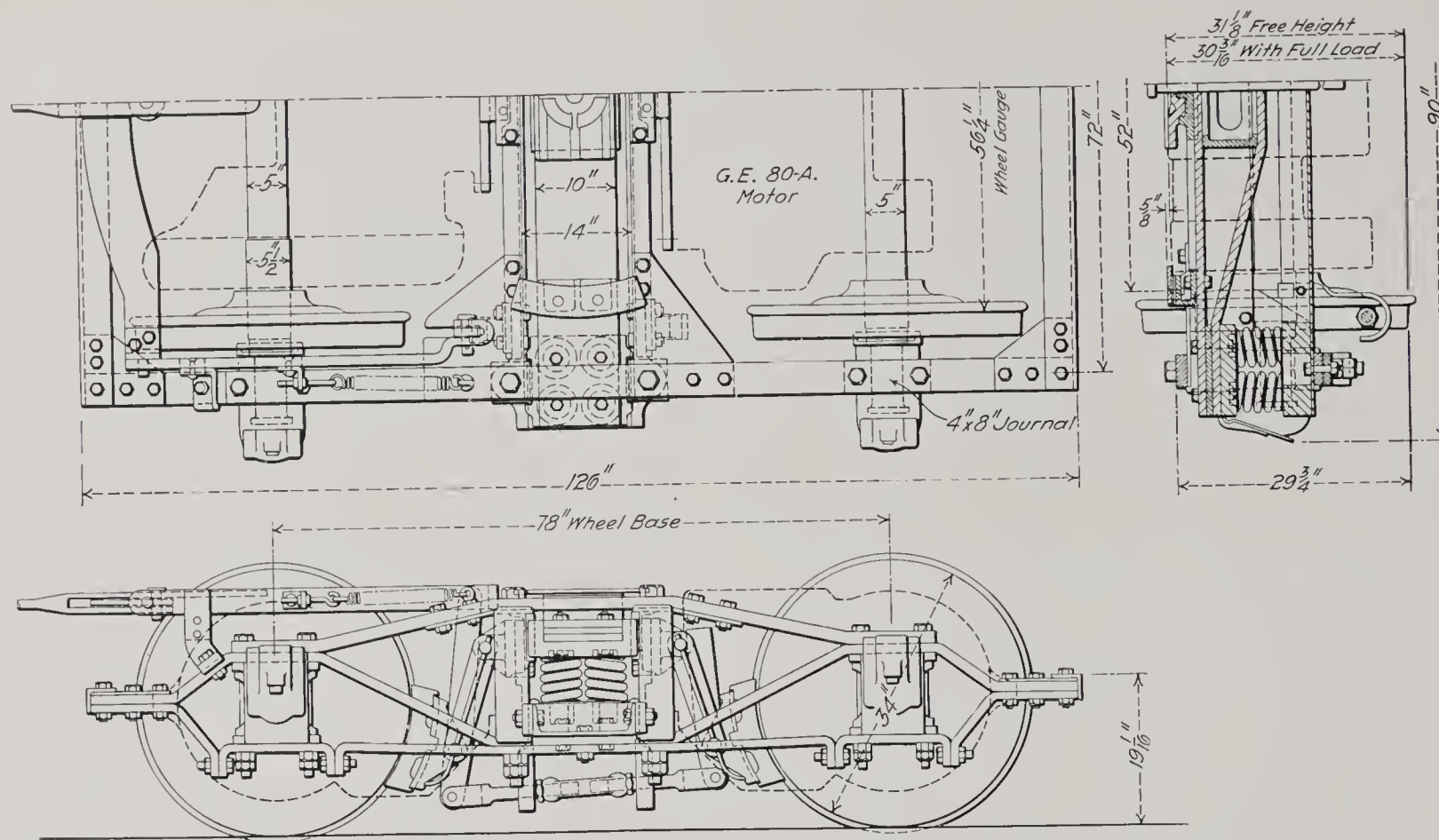


TYPE P-376 MOTOR TRUCK

BUILT FOR SCHENECTADY RAILWAY COMPANY, SCHENECTADY, N. Y.

CODE WORD "ALMUCAVAR"

AMERICAN LOCOMOTIVE COMPANY

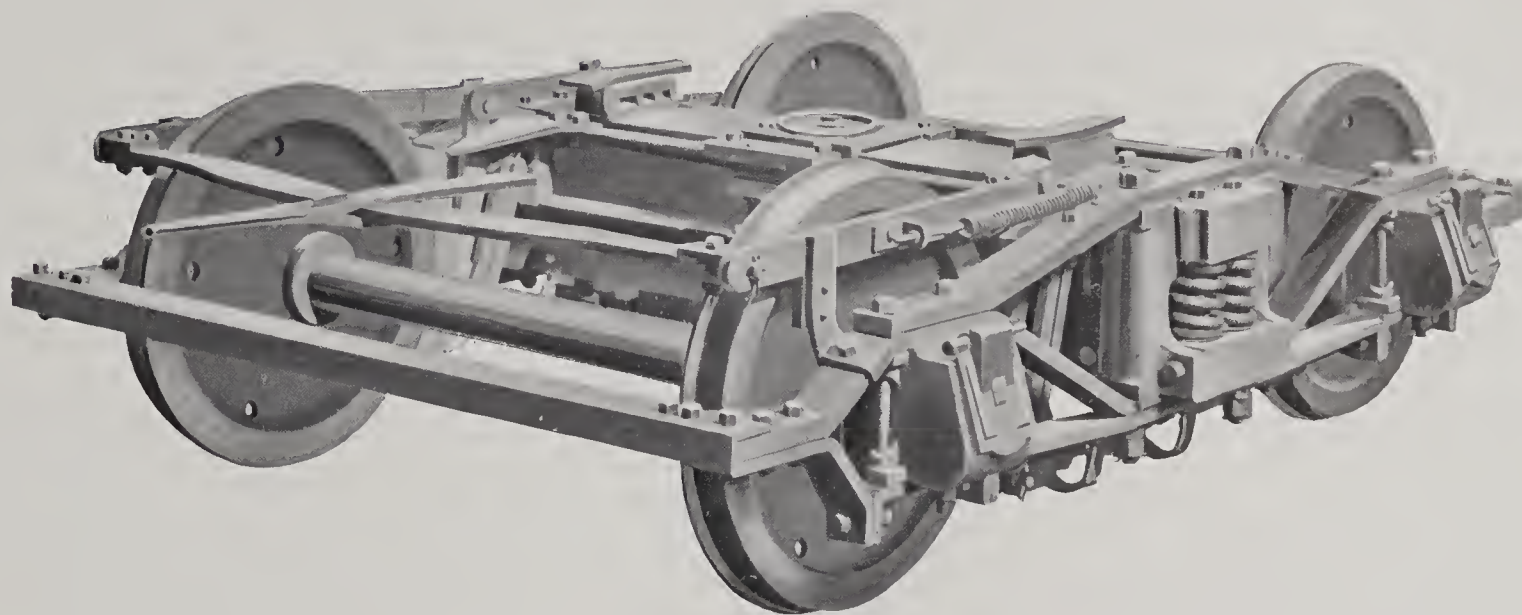


TYPE P-378 MOTOR TRUCK

BUILT FOR SCRANTON RAILWAY COMPANY, SCRANTON, PA.

Gauge of Track . . . 4 feet 8 1/2 inches	Load carried at Center Plate 35,000 pounds	Wheels . . . 34 inches, diameter
Wheel Base . . . 6 feet 6 inches	Weight without Motors, Wheels or Axles . . . 5,300 pounds	Axles . . . 5 inches, diameter
Total Length . . . 10 feet 6 inches	Weight complete, without Motors 8,000 pounds	Journals . . . 4 x 8 inches

AMERICAN LOCOMOTIVE COMPANY



TYPE P-378 MOTOR TRUCK

BUILT FOR SCRANTON RAILWAY COMPANY, SCRANTON, PA.

CODE WORD "ALMUCEDIE"

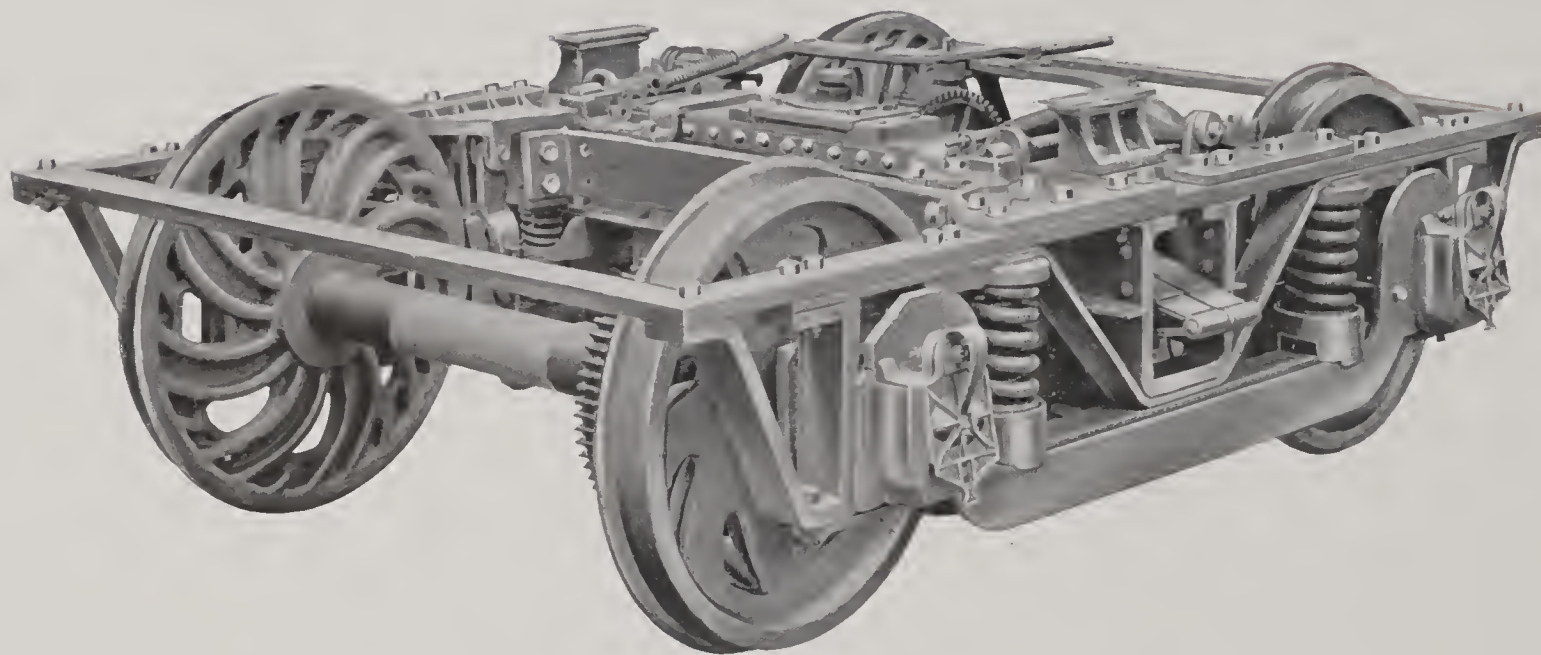
This truck was also built for Altoona & Logan Valley Electric Railway Company, Altoona, Pa.

110

12/33

Special Designs
of
Electric Motor Trucks

AMERICAN LOCOMOTIVE COMPANY



TYPE Z-280 MOTOR TRUCK

BUILT FOR MILWAUKEE NORTHERN RAILWAY, CEDARBURG, WIS.

AMERICAN LOCOMOTIVE COMPANY

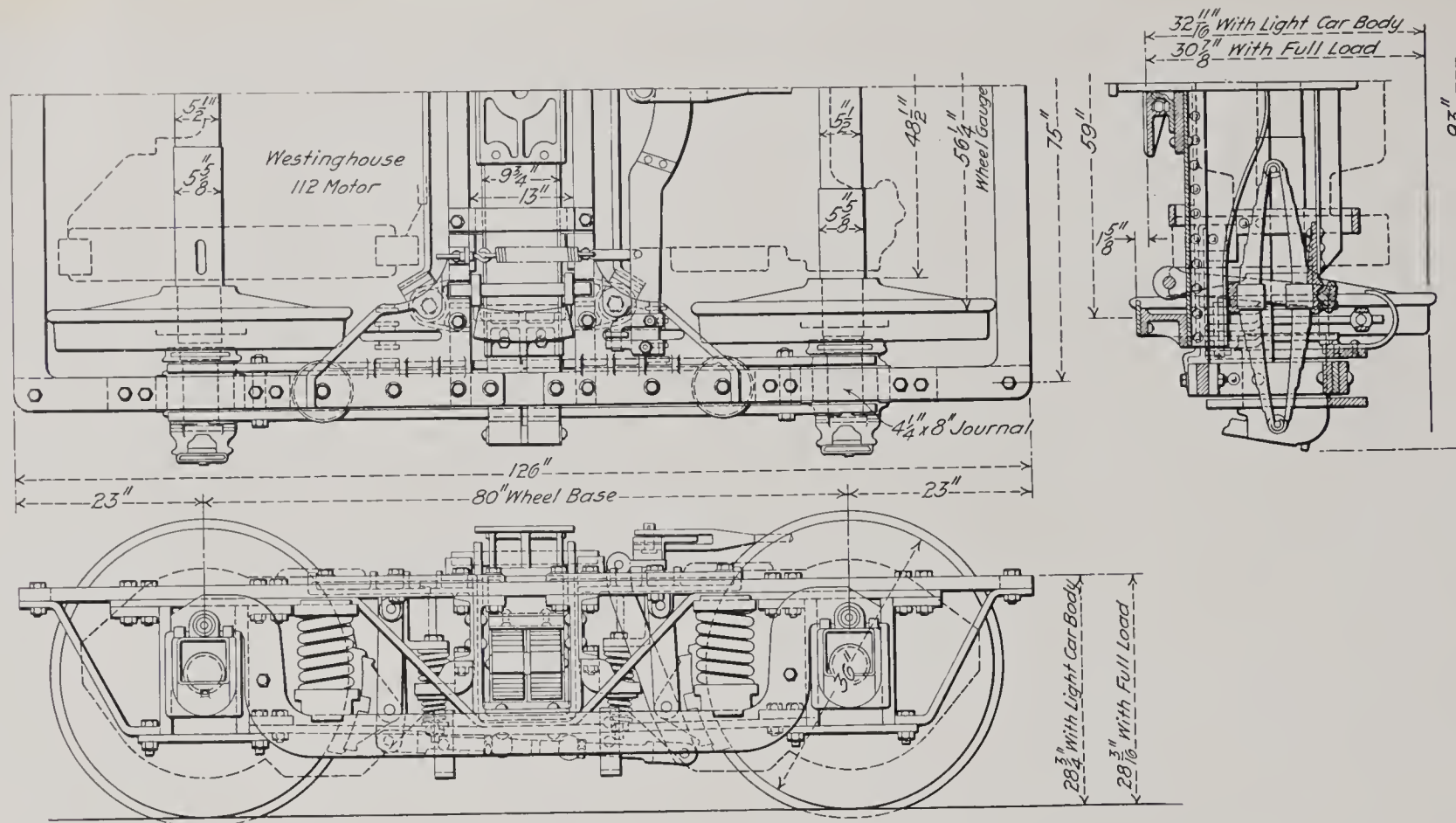
Type Z-280 Motor Truck

BUILT FOR MILWAUKEE NORTHERN RAILWAY

This truck is similar to our standard type "A" high speed motor truck, except for certain differences in the frame construction and arrangement of the brake rigging and in the construction of the bolster, which is of the built up type with channel iron top member and pressed steel bottom member. It is suitable for all motors that may be suspended inside of axles and may be built for any track gauge, and for carrying capacities at center plate up to 60,000 pounds.

The design includes a solid wrought iron top frame, swinging bolster, channel iron transoms, cast steel transom gussets and two-bar equalizers. In accordance with our standard practice, the cast steel transom gussets include swing link bearings and brake hanger lugs, thus reducing the number of parts. The transom channels are carried on shoulders provided on the frame center braces which reduces the shear on the bolts or rivets through brace and transom. The swinging bolster is carried on double or triple elliptic springs, as may be necessary, while coil springs carry the weight on the truck on the two-bar equalizers. Wear or rubbing pieces between bolster and transom prevent the bolster from cramping and transmit the strains on the bolster through the transoms to the truck side frames. The pedestals are provided with steel plate rubbing pieces, covering all wearing surfaces. These and other features common to our standard type "A" insure a truck in which strength, stiffness and simplicity are combined with perfect riding qualities.

AMERICAN LOCOMOTIVE COMPANY

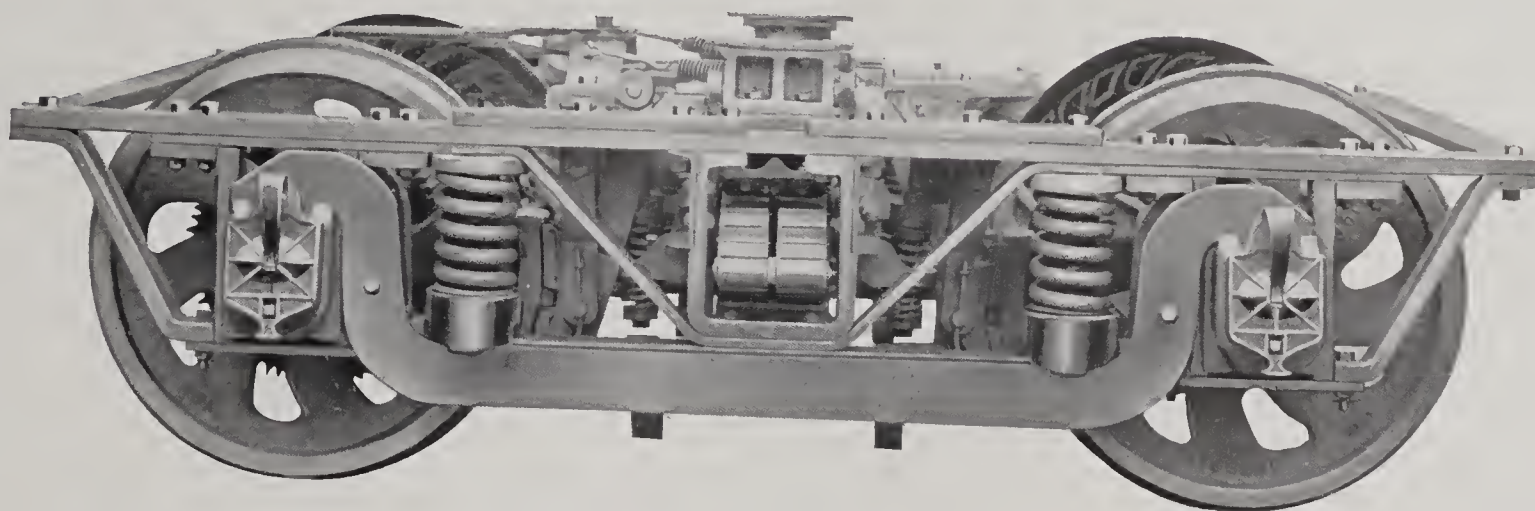


TYPE Z-280 MOTOR TRUCK

BUILT FOR MILWAUKEE NORTHERN RAILWAY, CEDARBURG, WIS.

Gauge of Track.	4 feet 8 1/2 inches	Load carried at Center Plate	25,000 pounds	Wheels	36 inches, diameter
Wheel Base	6 feet 8 inches	Weight without Motors, Wheels or Axles	6,500 pounds	Axles	5 1/2 inches, diameter
Total Length	10 feet 6 inches	Weight complete, without Motors	10,000 pounds	Journals	4 1/4 x 8 inches

AMERICAN LOCOMOTIVE COMPANY

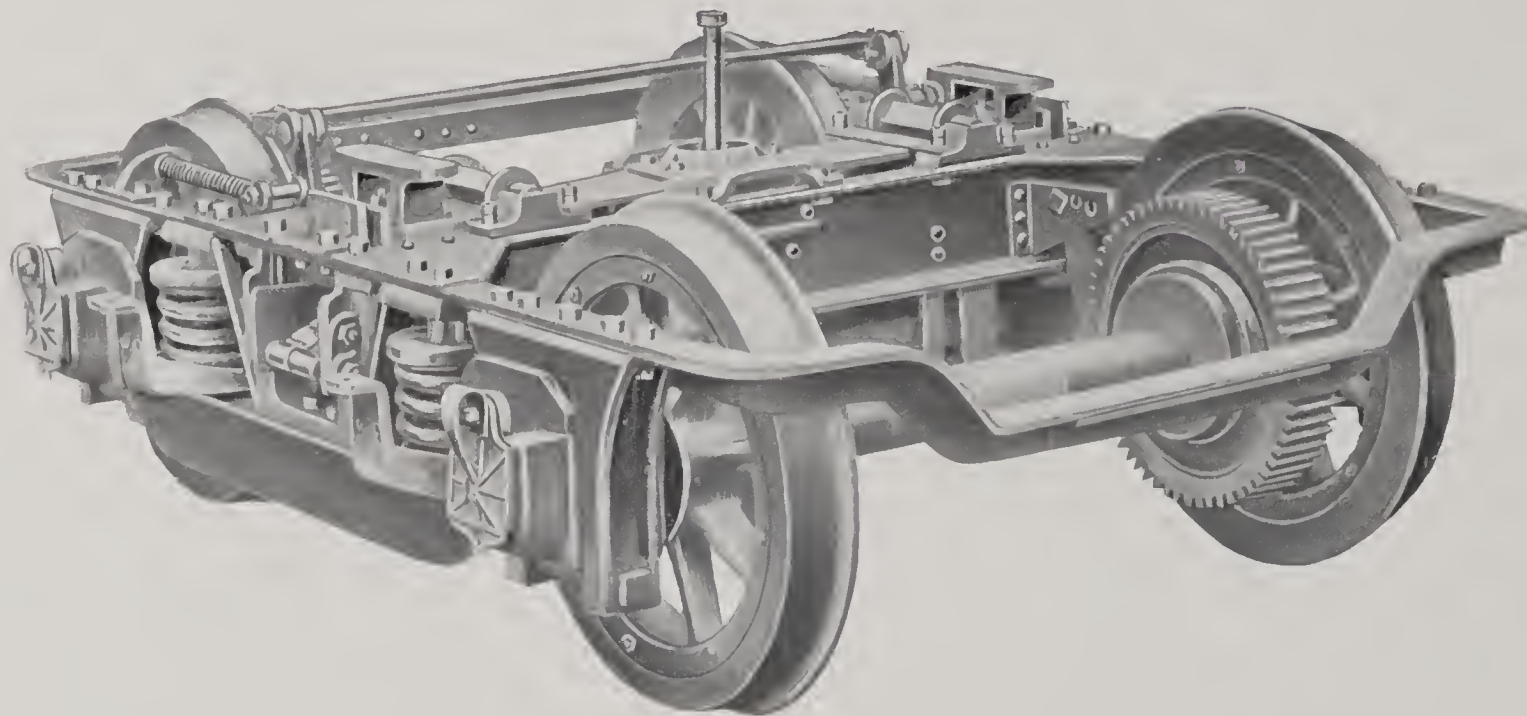


TYPE Z-280 MOTOR TRUCK

BUILT FOR MILWAUKEE NORTHERN RAILWAY, CEDARBURG, WIS.

CODE WORD "ALMUCELLA"

AMERICAN LOCOMOTIVE COMPANY



TYPE Z-372 MOTOR TRUCK

BUILT FOR INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

AMERICAN LOCOMOTIVE COMPANY

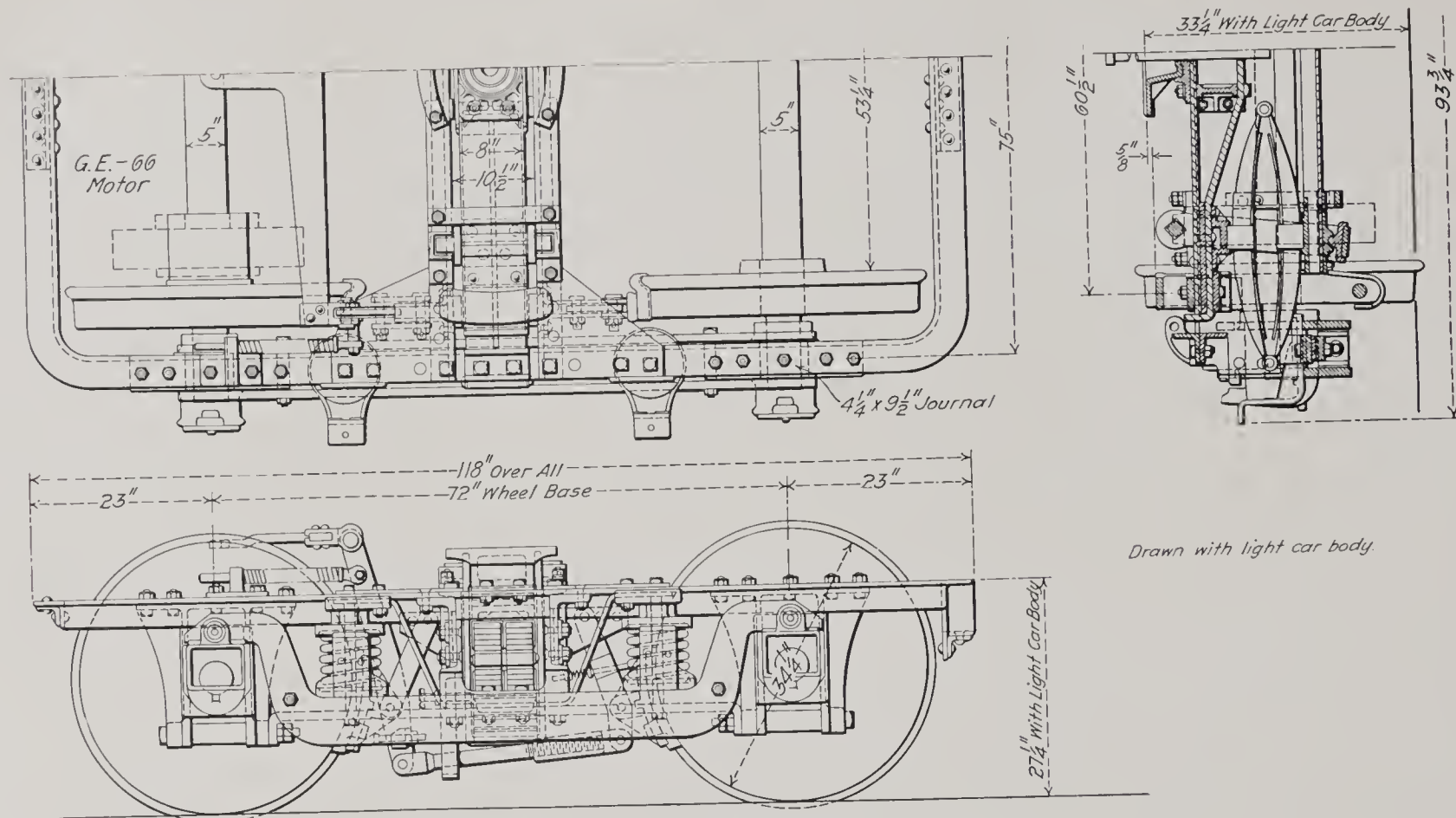
Type Z-372 Motor Truck

BUILT FOR INTERBOROUGH RAPID TRANSIT COMPANY

This type of truck represents a special design for high speed interurban service, built to drawings and specifications furnished by the railway company. The design may be modified to suit all motors that may be suspended inside of axles and may be built for any track gauge with a wheel base to suit motors, and for carrying capacities at center plate up to 60,000 pounds.

The principal features of the design are—angle iron top frame made in two pieces, spliced together at end centers by angle iron tie plates; cast steel pedestals; channel iron transoms; plate steel transom gussets; swinging bolsters of the built up type and two-bar equalizers. The transom channels are carried on cast steel center castings, machine fitted to the truss of the frame, the whole being tied together by large bolts through top frames, transoms, truss and bottom tie bar. The frames and transoms are stiffened by the use of cast steel transom end castings. The cast steel pedestals are carefully fitted and well bolted to the angle iron top frames and are provided with cast iron thimble or spreader at the bottom and large bolt through pedestal legs and thimble. The swinging bolsters are carried on double elliptic springs, while coil springs carry the weight on the truck on the two-bar equalizers.

AMERICAN LOCOMOTIVE COMPANY

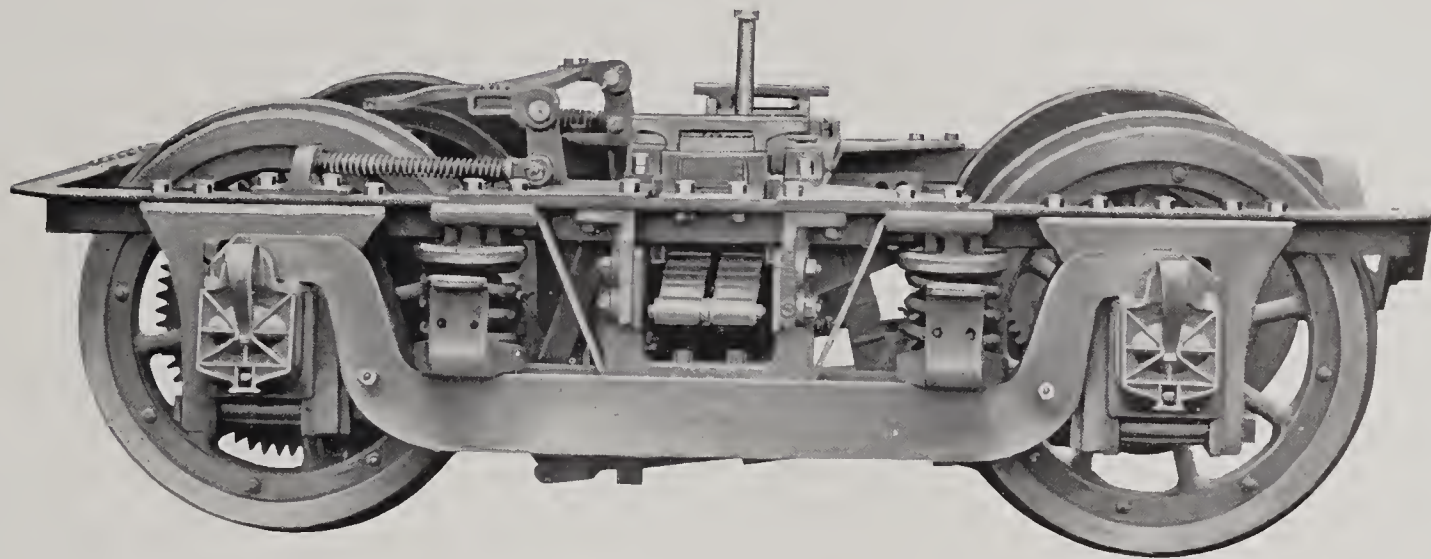


TYPE Z-372 MOTOR TRUCK

BUILT FOR INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

Gauge of Track .	4 feet 8 1/2 inches	Load carried at Center Plate	26,000 pounds	Wheels .	34 1/4 inches, diameter
Wheel Base	6 feet	Weight without Motors, Wheels or Axles	6,000 pounds	Axles	5 inches, diameter
Total Length	9 feet 10 inches	Weight complete, without Motors	10,400 pounds	Journals	4 1/4 x 9 1/2 inches

AMERICAN LOCOMOTIVE COMPANY

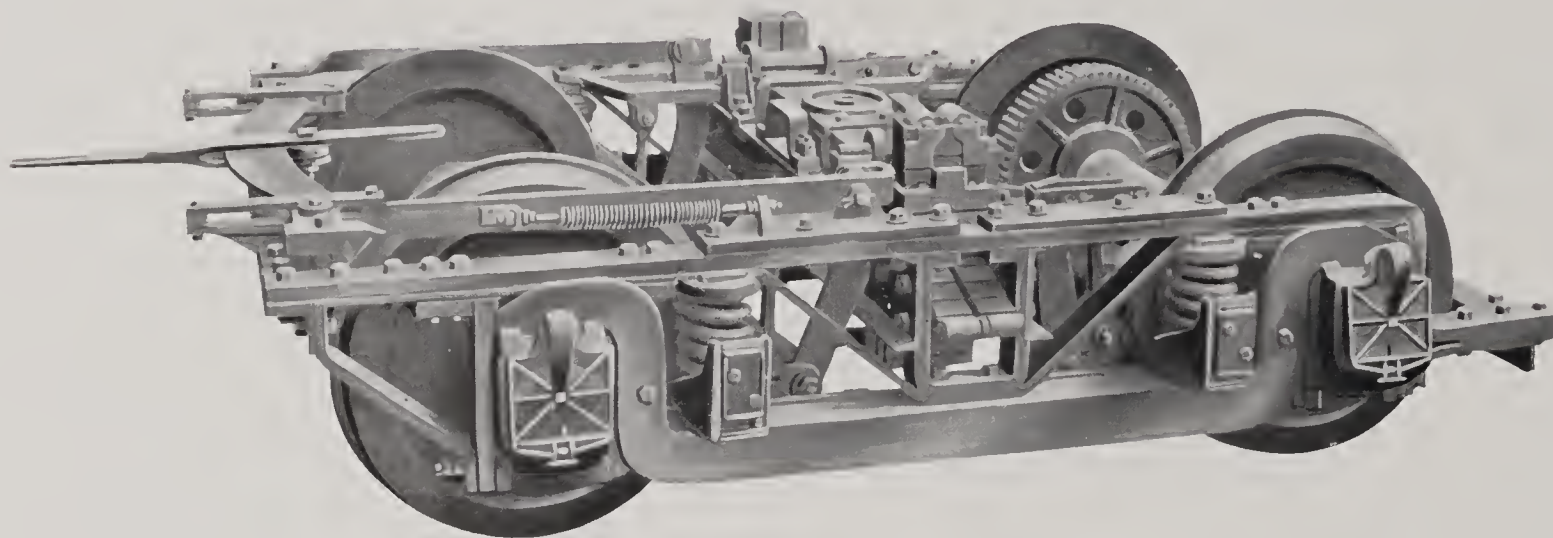


TYPE Z-372 MOTOR TRUCK

BUILT FOR INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

CODE WORD "ALMUDADA"

AMERICAN LOCOMOTIVE COMPANY



TYPE Z-380 MOTOR TRUCK

BUILT FOR BROOKLYN RAPID TRANSIT COMPANY, BROOKLYN, N. Y.

AMERICAN LOCOMOTIVE COMPANY

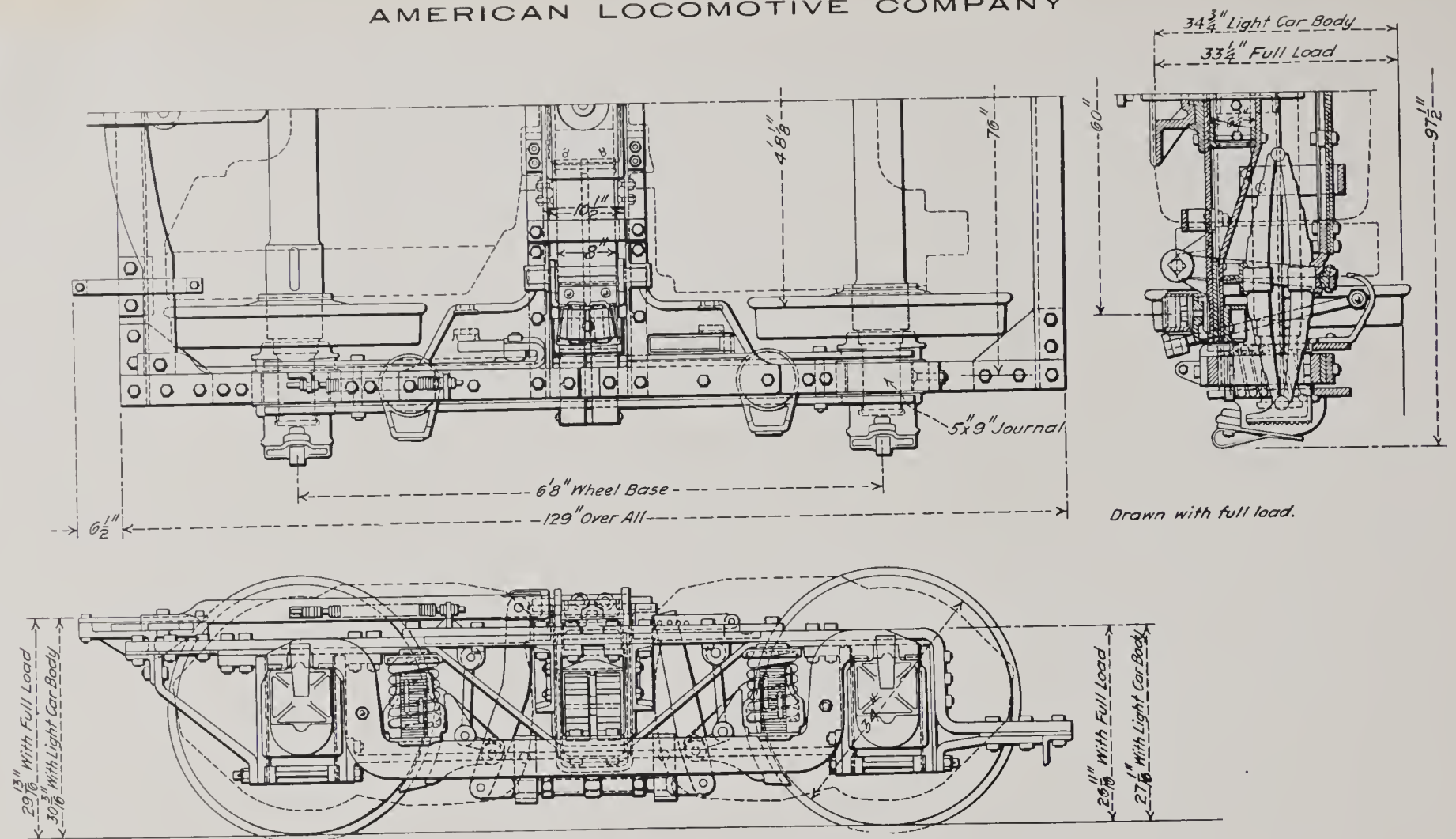
Type Z-380 Motor Truck

BUILT FOR BROOKLYN RAPID TRANSIT COMPANY

This type of truck represents a modification of our standard high speed truck to meet special requirements. It is suitable for motors that may be suspended inside of axles and may be built for any track gauge, with wheel base to suit motors, and for carrying capacities at center plate up to 60,000 pounds.

In this design the side frames, which are of wrought iron, are dropped down at one end to clear car body platform and steps and tied together at ends by heavy angles braced at corners with steel plate gussets. Except for this modification in the frame construction, this truck embodies all the features of our standard high speed truck, being built with channel iron transoms, cast steel transom gussets, swinging bolsters of the built up type and two-bar equalizers. The transom gussets include brake hanger lugs, swing link pin bearings, and brackets for brake release spring rods, thereby reducing the number of parts. The swinging bolster is carried on either double or triple elliptic springs, as the load may require, while coil springs carry the load on the truck on the two-bar equalizers. The transom channels are carried by lips provided on the frame center braces, thus reducing the shear on the usual bolts or rivets through brace and transom. Wear or rubbing pieces between bolster and transom prevent the bolster from cramping and transmit the strains on the bolster through the transoms to the truck side frames, without interfering with the free action of the bolster and springs. These features of the design insure a truck in which strength, stiffness and simplicity are combined with easy riding qualities.

AMERICAN LOCOMOTIVE COMPANY

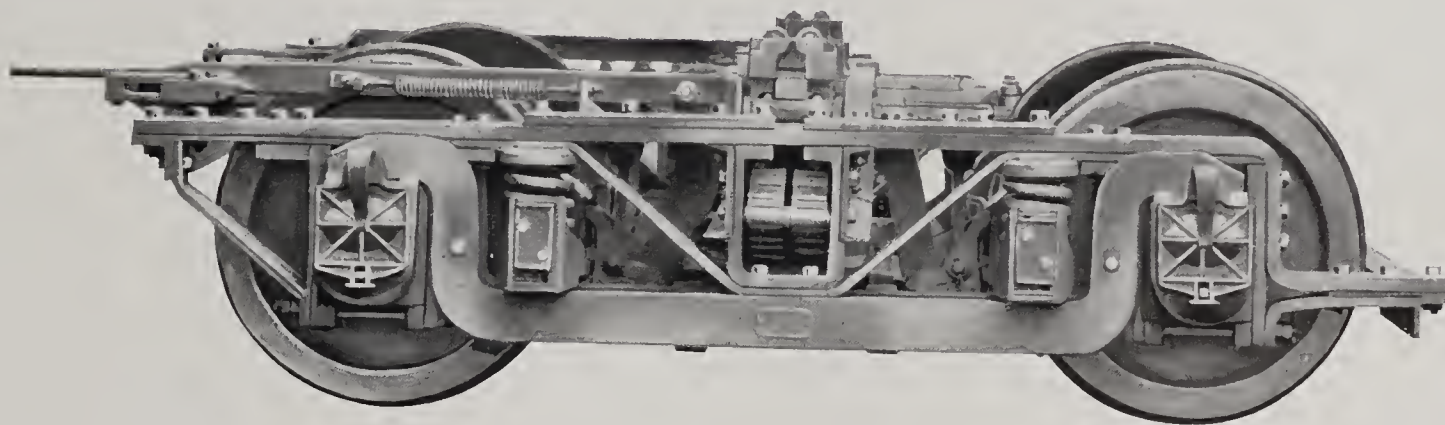


TYPE Z-380 MOTOR TRUCK

BUILT FOR BROOKLYN RAPID TRANSIT COMPANY, BROOKLYN, N. Y.

Gauge of Track . . .	4 feet 8 1/2 inches	Load carried at Center Plate . . .	28,500 pounds	Wheels . . .	34 inches, diameter
Wheel Base . . .	6 feet 8 inches	Weight without Motors, Wheels or Axles . . .	6,500 pounds	Axles . . .	6 1/2 inches, diameter
Total Length . . .	10 feet 9 inches	Weight complete, without Motors . . .	12,000 pounds	Journals . . .	5 x 9 inches

AMERICAN LOCOMOTIVE COMPANY

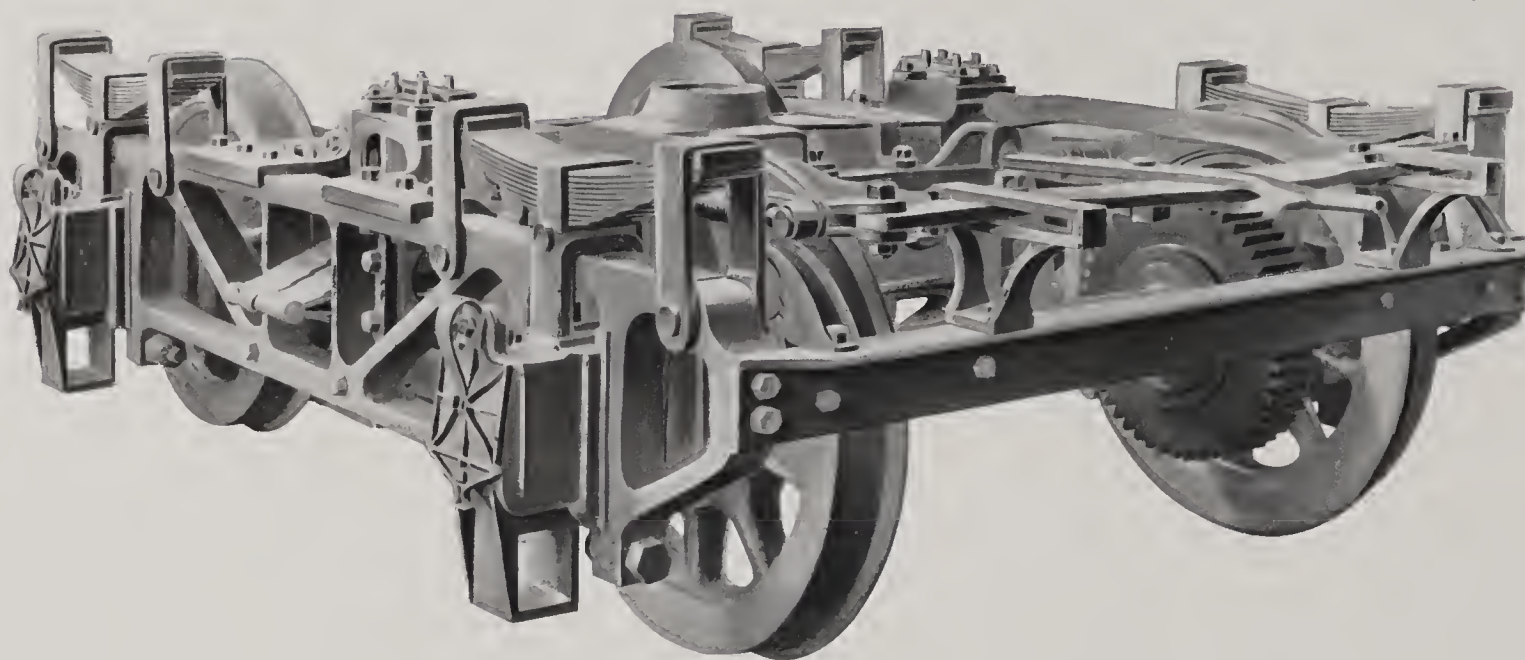


TYPE Z-380 MOTOR TRUCK

BUILT FOR BROOKLYN RAPID TRANSIT COMPANY, BROOKLYN, N. Y.

CODE WORD "ALMUDE"

AMERICAN LOCOMOTIVE COMPANY



TYPE Z-484 MOTOR TRUCK

BUILT FOR NEW YORK CENTRAL & HUDSON RIVER RAILROAD, NEW YORK, N. Y.

AMERICAN LOCOMOTIVE COMPANY

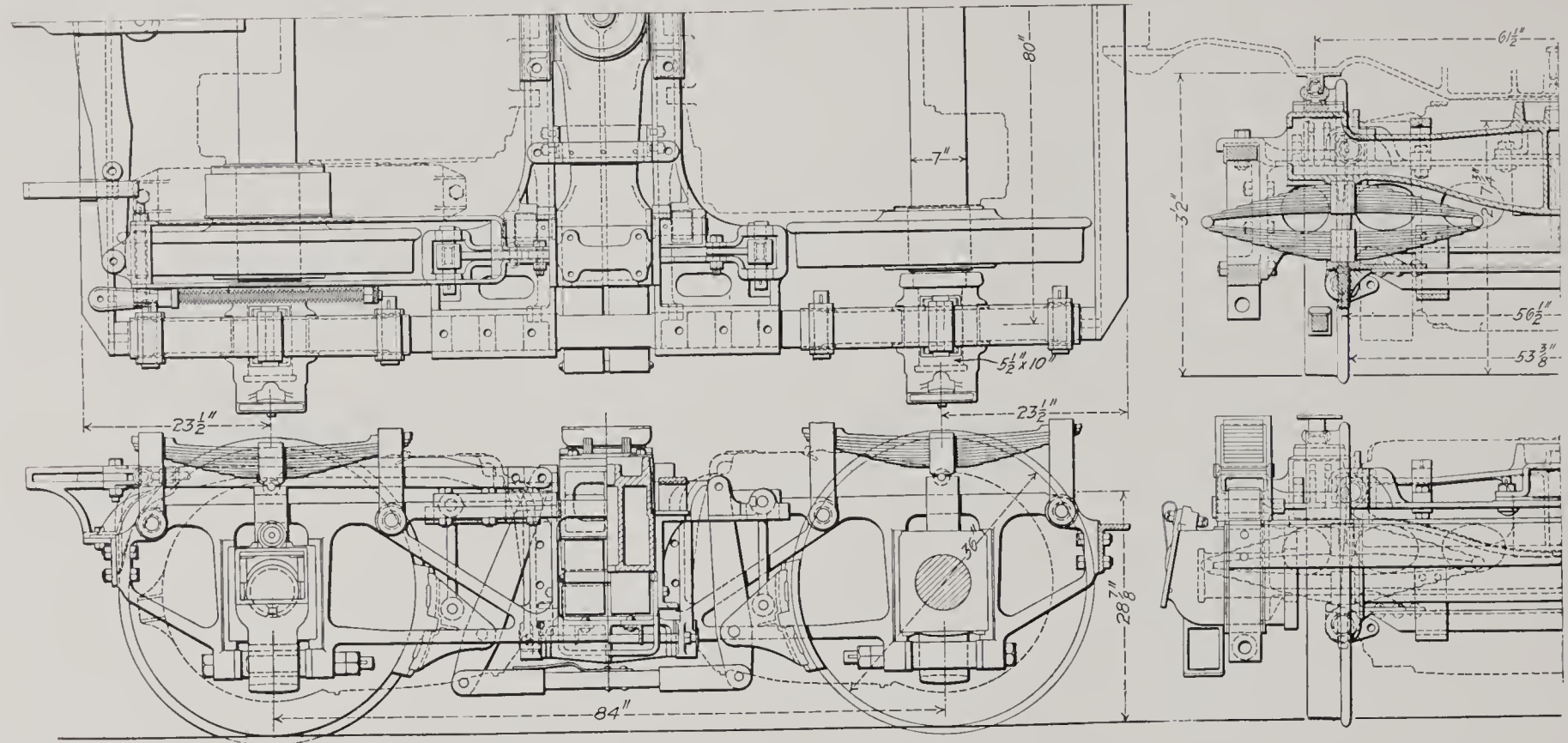
Type Z-484 Motor Truck

BUILT FOR NEW YORK CENTRAL & HUDSON RIVER RAILROAD

This truck represents the adaptability of steam locomotive constructive methods to motor trucks for heavy electric service. It was designed to meet the severest requirements of heavy high speed service and it is suitable for all motors that may be suspended inside of axles. It may be built to any track gauge, with wheel base to suit motors, and for carrying capacities at center plate up to 60,000 pounds. This type, however, is not recommended where the load at center plate does not exceed 30,000 pounds.

This truck is built with solid cast steel side frames of trussed construction, tied together at the ends with angle iron end frames to which they are machine fitted. The bolster is designed to provide the maximum of strength with a minimum of weight. It is a single piece of steel casting of I-section, and box girder construction at ends and center and with center plate cast integral. The enlarged sections at each end fit closely within the guiding faces of the transom castings, thus preventing canting of the bolster. The transoms are of cast steel of channel section and are so designed as to provide an exceptionally rigid connection with the side frames. The bearings for swing link pins and brake hanger brackets are integral with the transom castings, which reduces the number of parts to a minimum. The swinging bolster is supported by double elliptic springs; while the truck frame is suspended from semi-elliptic springs over the journal boxes by means of spring hangers. The semi-elliptic springs rest on rocker pins lying in milled slots in the top of the spring saddle and lower face of the spring band, thus providing proper flexibility at the point of support.

AMERICAN LOCOMOTIVE COMPANY



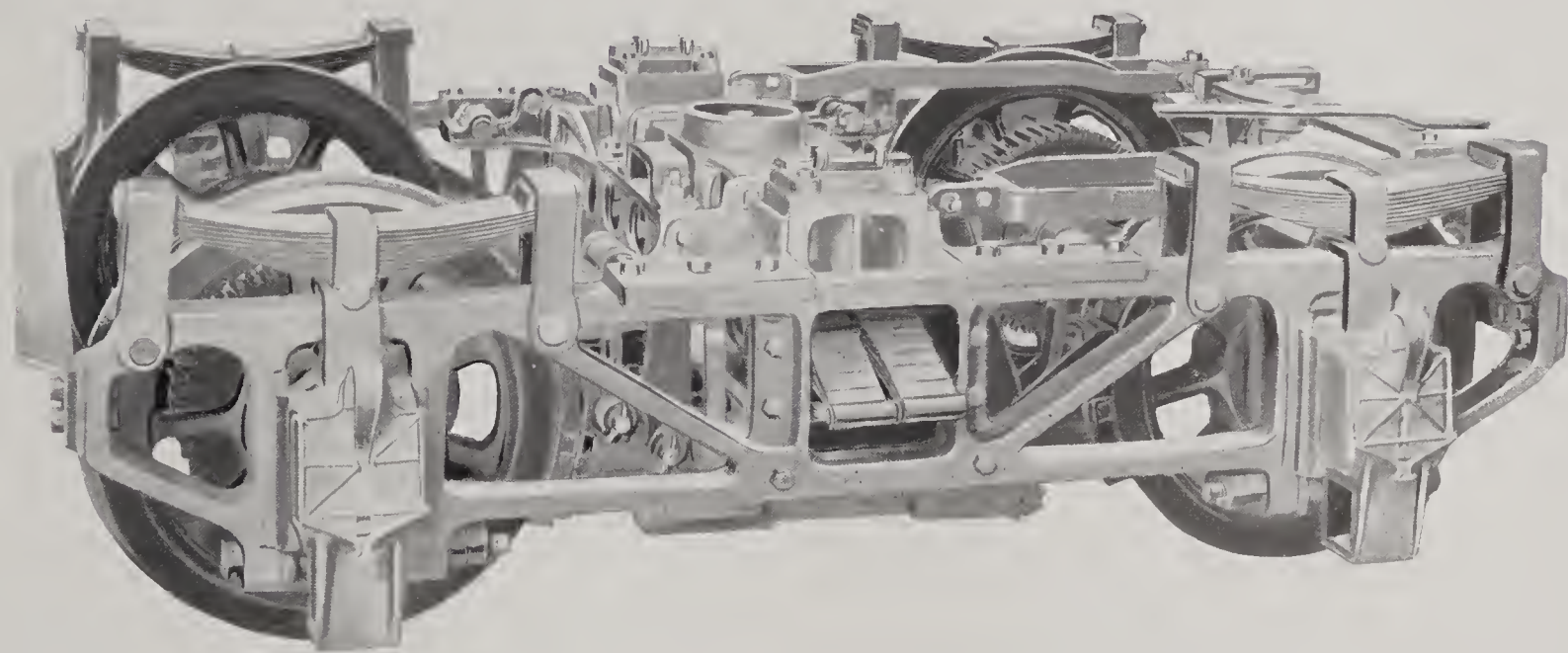
TYPE Z-484 MOTOR TRUCK

BUILT FOR NEW YORK CENTRAL & HUDSON RIVER RAILROAD, NEW YORK, N. Y.

Gauge of Track	4 feet 8 1/2 inches	Load carried at Center Plate	40,000 pounds	Wheels	36 inches, diameter
Wheel Base	7 feet	Weight without Motors, Wheels or Axles	8,800 pounds	Axles	7 inches, diameter
Total Length	10 feet 11 inches	Weight complete, without Motors	15,300 pounds	Journals	5 1/2 x 10 inches

AMERICAN LOCOMOTIVE COMPANY

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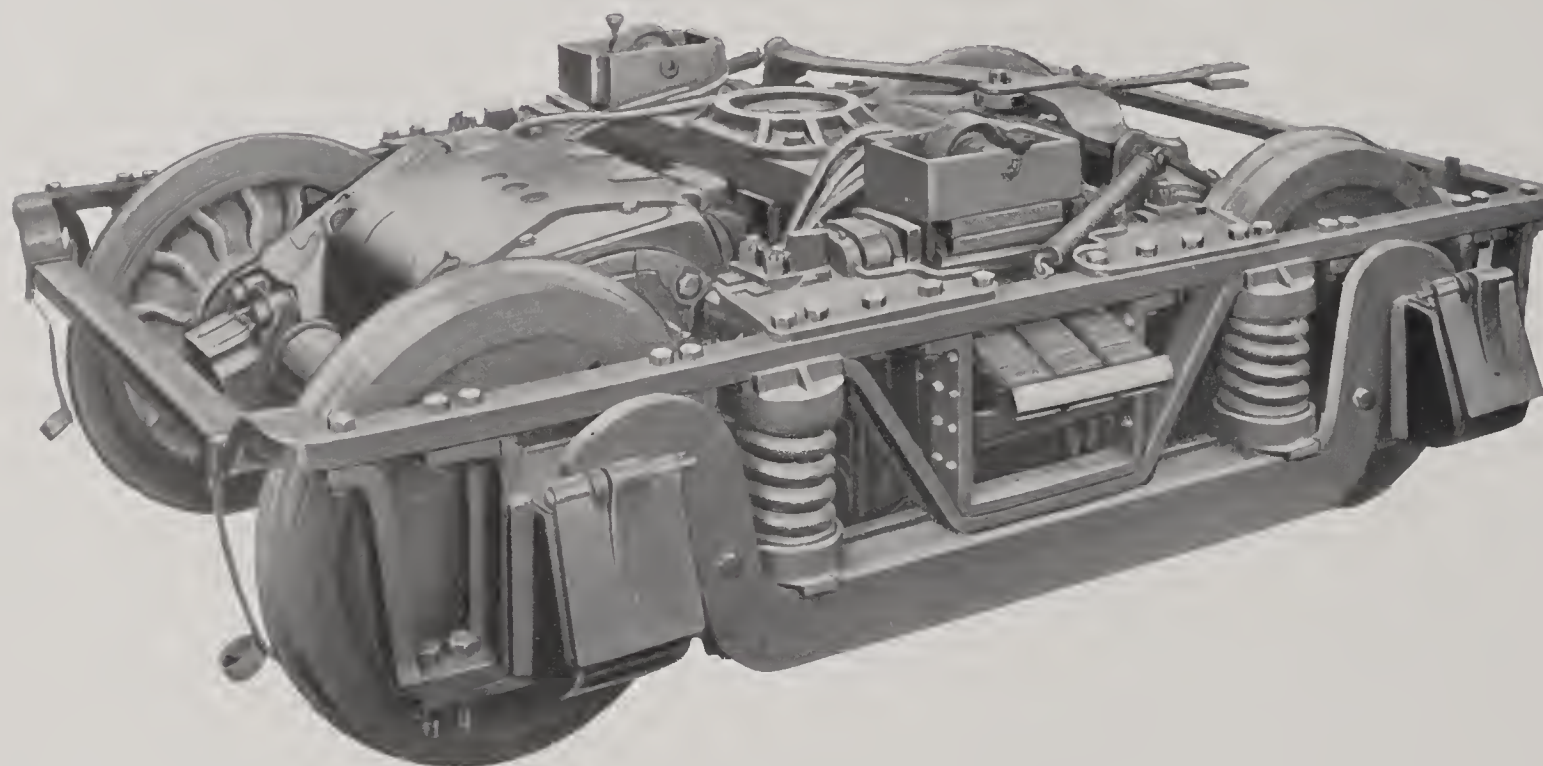


TYPE Z-484 MOTOR TRUCK

BUILT FOR NEW YORK CENTRAL & HUDSON RIVER RAILROAD, NEW YORK, N. Y.

CODE WORD "ALMUDEJOS"

AMERICAN LOCOMOTIVE COMPANY



TYPE Z-588 MOTOR TRUCK

BUILT FOR DELAWARE & HUDSON COMPANY

CODE WORD "ALMUDELIN"

AMERICAN LOCOMOTIVE COMPANY

Type Z-588 Motor Truck

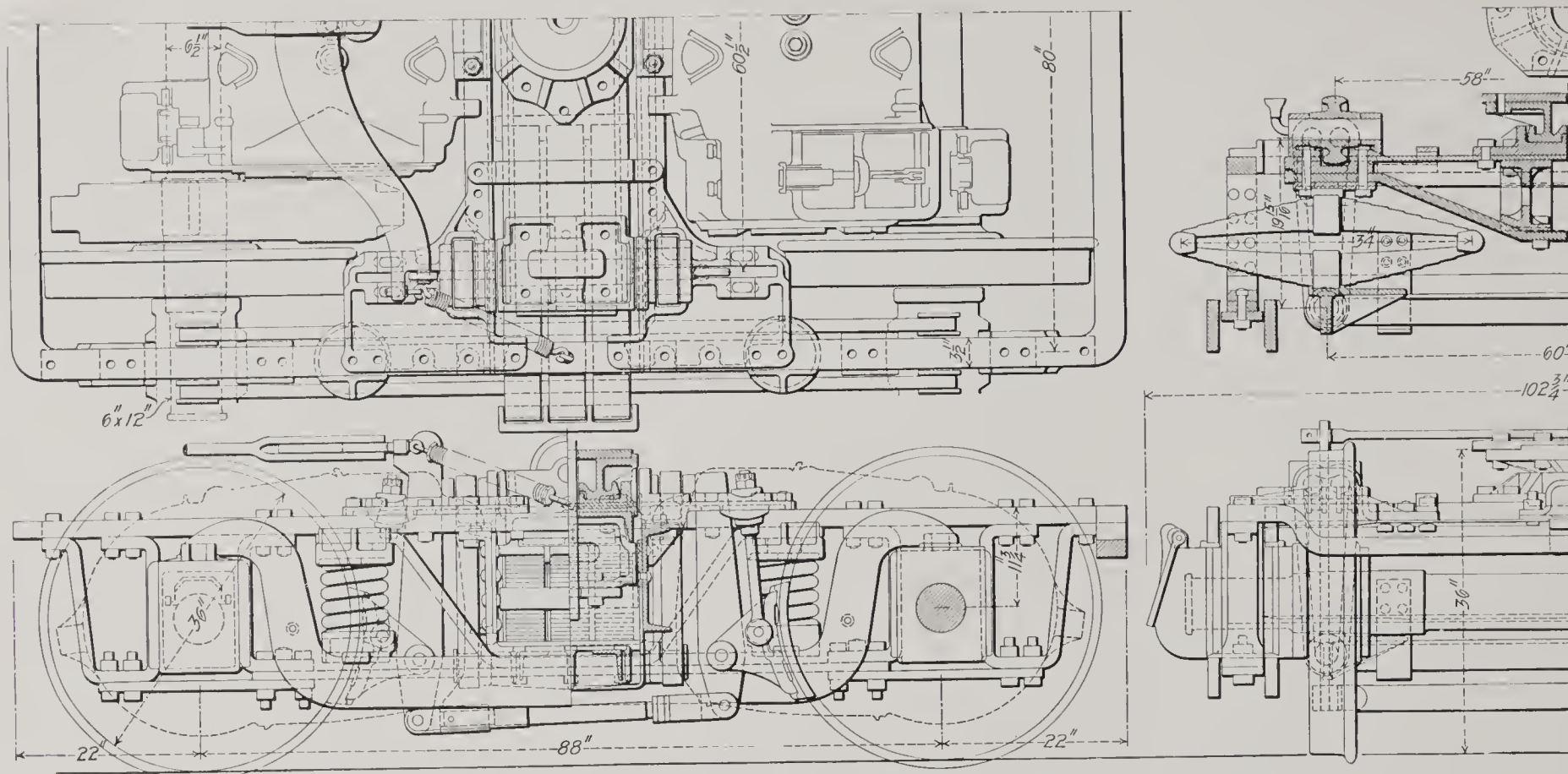
BUILT FOR DELAWARE & HUDSON COMPANY

This type of truck is adapted to meet the severest requirements of heavy high speed interurban service. It is suitable for all motors that may be suspended inside of axles and may be built for any track gauge with wheel base to suit motors, and for carrying capacities at the center plate up to 60,000 pounds.

This design is built with solid wrought iron top frame dropped down at one end to clear car body timbers; swinging bolster of the built up type, with channel iron top member and bar iron bottom member; channel iron transoms; cast steel transom gussets and two-bar equalizers. As in our standard type of high speed truck, the cast steel transom gussets include brake hanger lugs and bearings for swing link pins, thereby dispensing with a number of small parts usually bolted to the frames and transoms. The transom channels are carried on shoulders provided on the frame center braces, thus reducing the shear on the bolts or rivets through brace and transom. The swinging bolster is carried on triple elliptic springs, while coil springs carry the weight on the truck on the two-bar equalizers.

The design throughout has been developed with a view toward strength, stiffness and easy riding qualities.

AMERICAN LOCOMOTIVE COMPANY



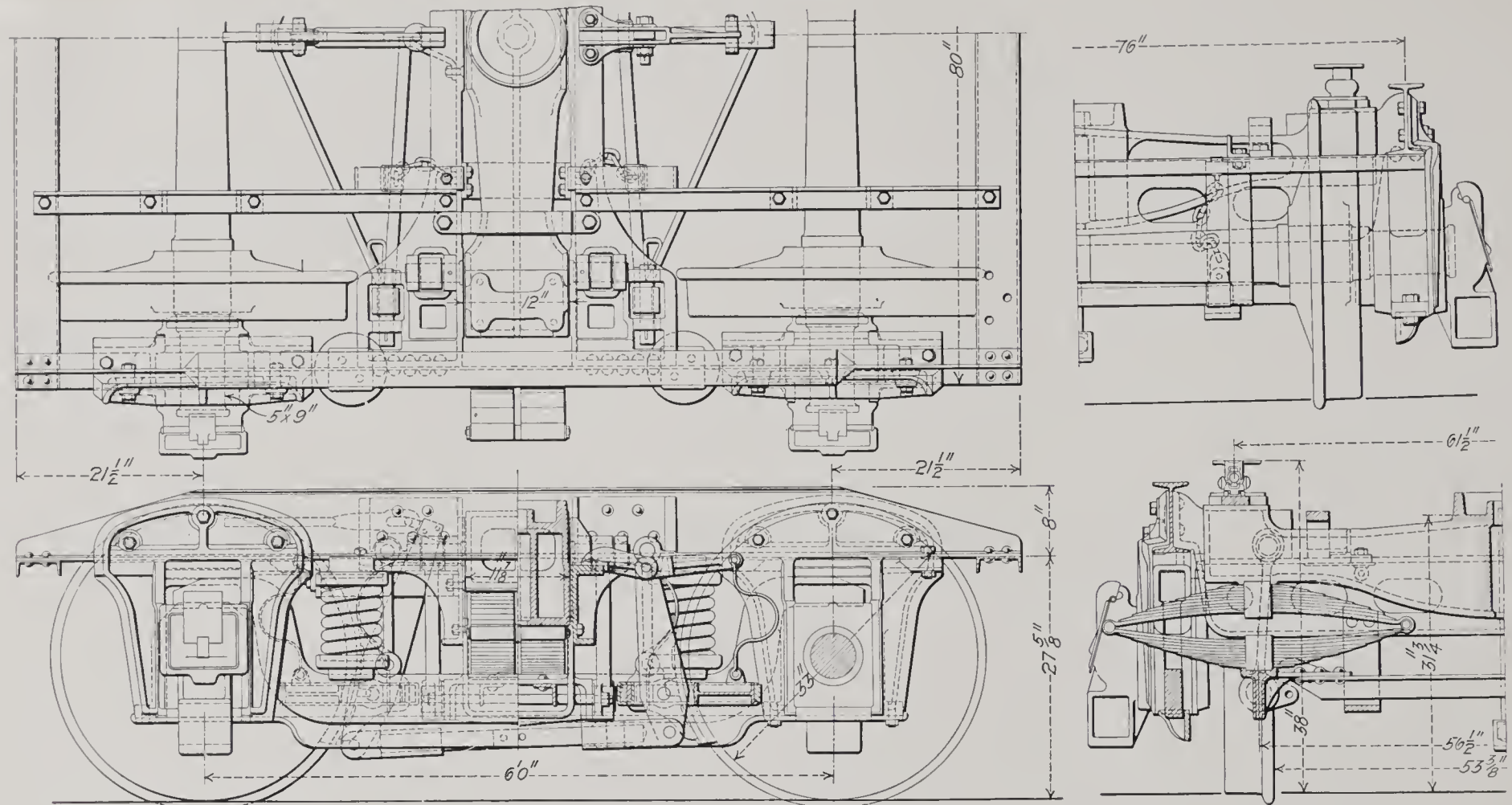
TYPE Z-588 MOTOR TRUCK

BUILT FOR DELAWARE & HUDSON COMPANY

Gauge of Track	4 feet 8 1/2 inches	Load carried at Center Plate	55,000 pounds	Wheels	36 inches, diameter
Wheel Base	7 feet 4 inches	Weight without Motors, Wheels or Axles	10,700 pounds	Axles	6 1/2 inches, diameter
Total Length	12 feet	Weight complete, without Motors	16,100 pounds	Journals	6 x 12 inches

Electric Locomotive
and
Trailer Trucks

AMERICAN LOCOMOTIVE COMPANY

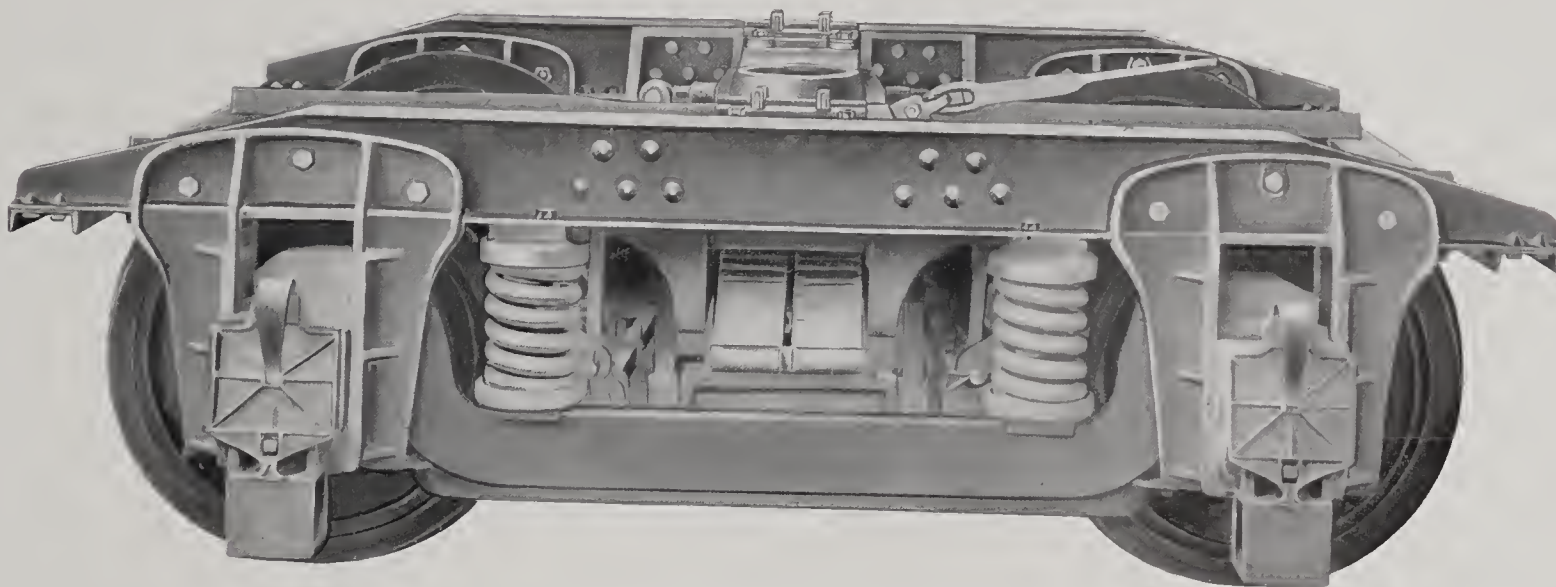


TRAILER TRUCK

BUILT FOR NEW YORK CENTRAL & HUDSON RIVER RAILROAD, NEW YORK, N. Y.

Gauge of Track	4 feet 8 1/2 inches	Load carried at Center Plate	38,000 pounds	Wheels	33 inches, diameter
Wheel Base	6 feet	Weight without Wheels or Axles	6,400 pounds	Axles	M.C.B. Standard
Total Length	9 feet 7 inches	Weight complete	11,000 pounds	Journals	5 x 9 inches

AMERICAN LOCOMOTIVE COMPANY

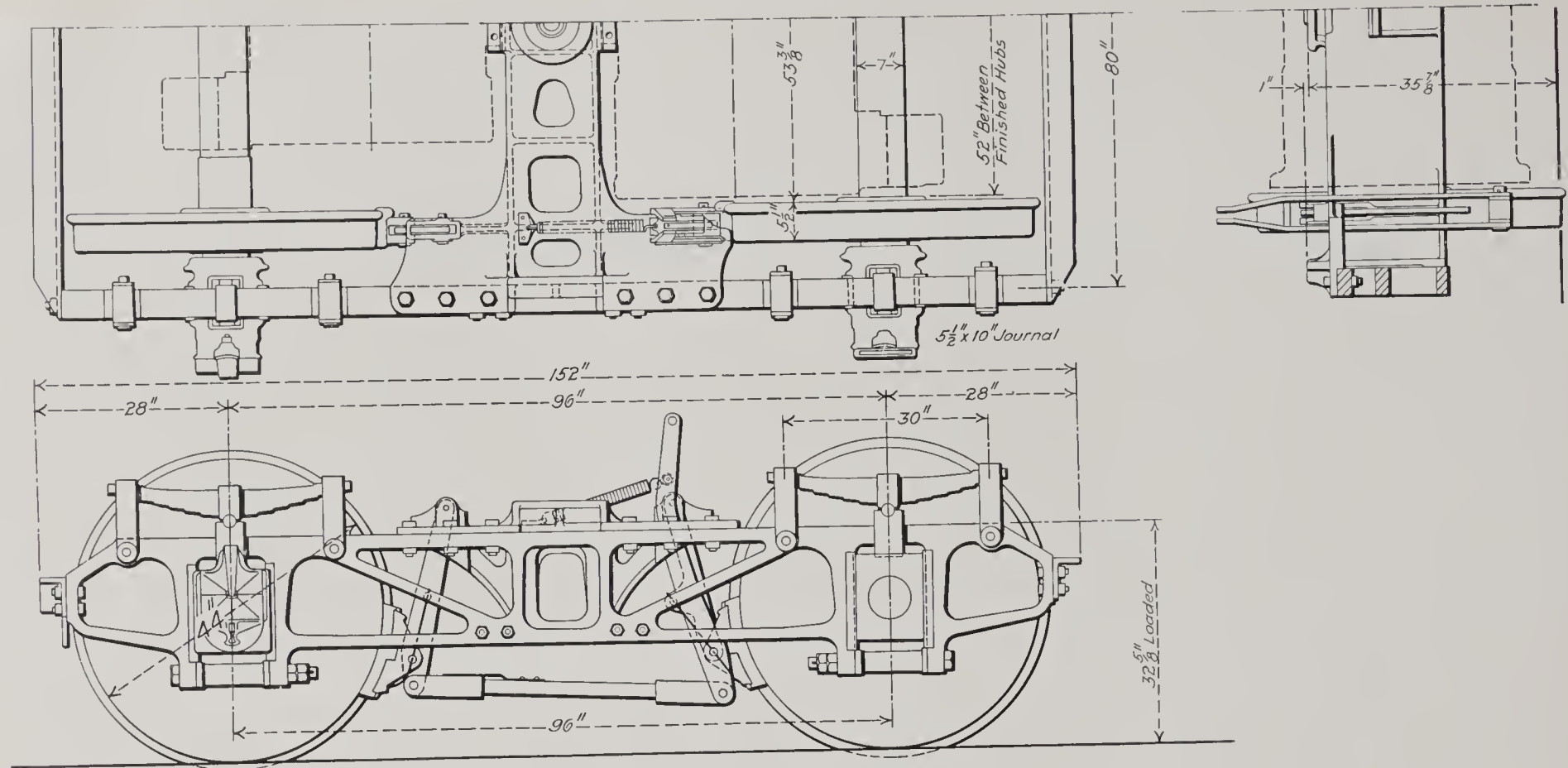


TRAILER TRUCK

BUILT FOR NEW YORK CENTRAL & HUDSON RIVER RAILROAD, NEW YORK, N. Y.

CODE WORD "ALMUDELIOS"

AMERICAN LOCOMOTIVE COMPANY

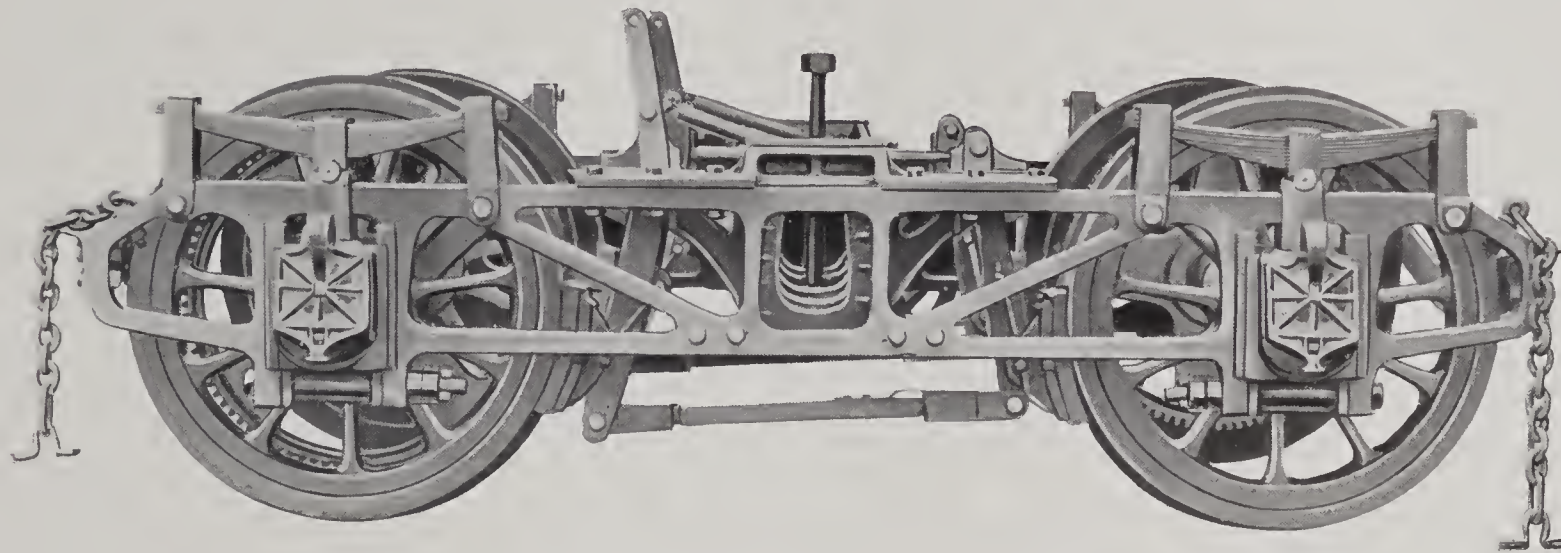


ELECTRIC LOCOMOTIVE MOTOR TRUCK

BUILT FOR THE ILLINOIS TRACTION SYSTEM, CHAMPAIGN, ILL.

Gauge of Track	4 feet 8 1/2 inches	Load carried at Center Plate	23,100 pounds	Wheels	44 inches, diameter
Wheel Base	8 feet	Weight without Motors, Wheels or Axles	9,500 pounds	Axles	7 inches, diameter
Total Length	12 feet 8 inches	Weight complete, without Motors	14,300 pounds	Journals	5 1/2 x 10 inches

AMERICAN LOCOMOTIVE COMPANY

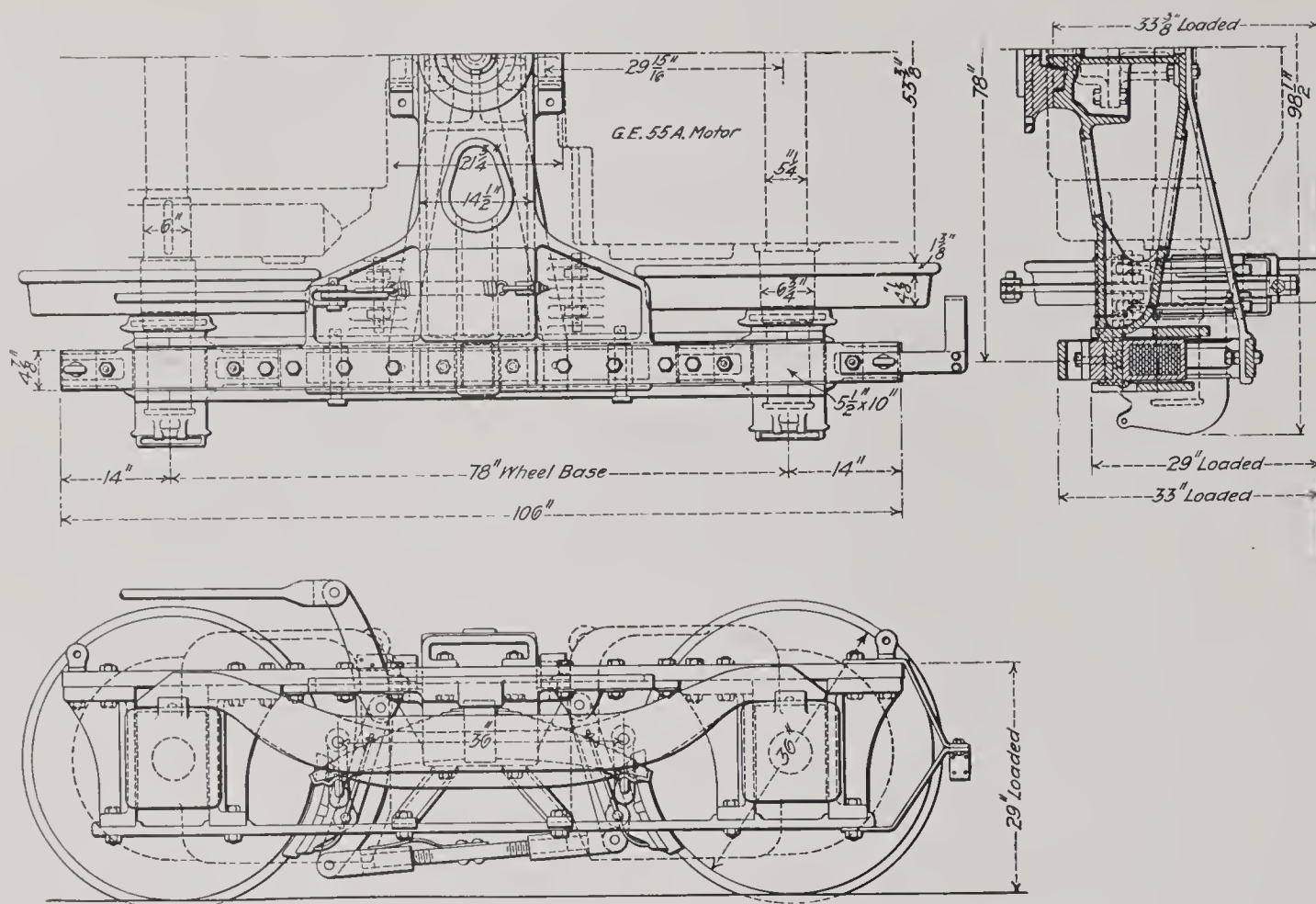


ELECTRIC LOCOMOTIVE MOTOR TRUCK

BUILT FOR THE ILLINOIS TRACTION SYSTEM, CHAMPAIGN, ILL.

CODE WORD "ALMUDERO"

AMERICAN LOCOMOTIVE COMPANY

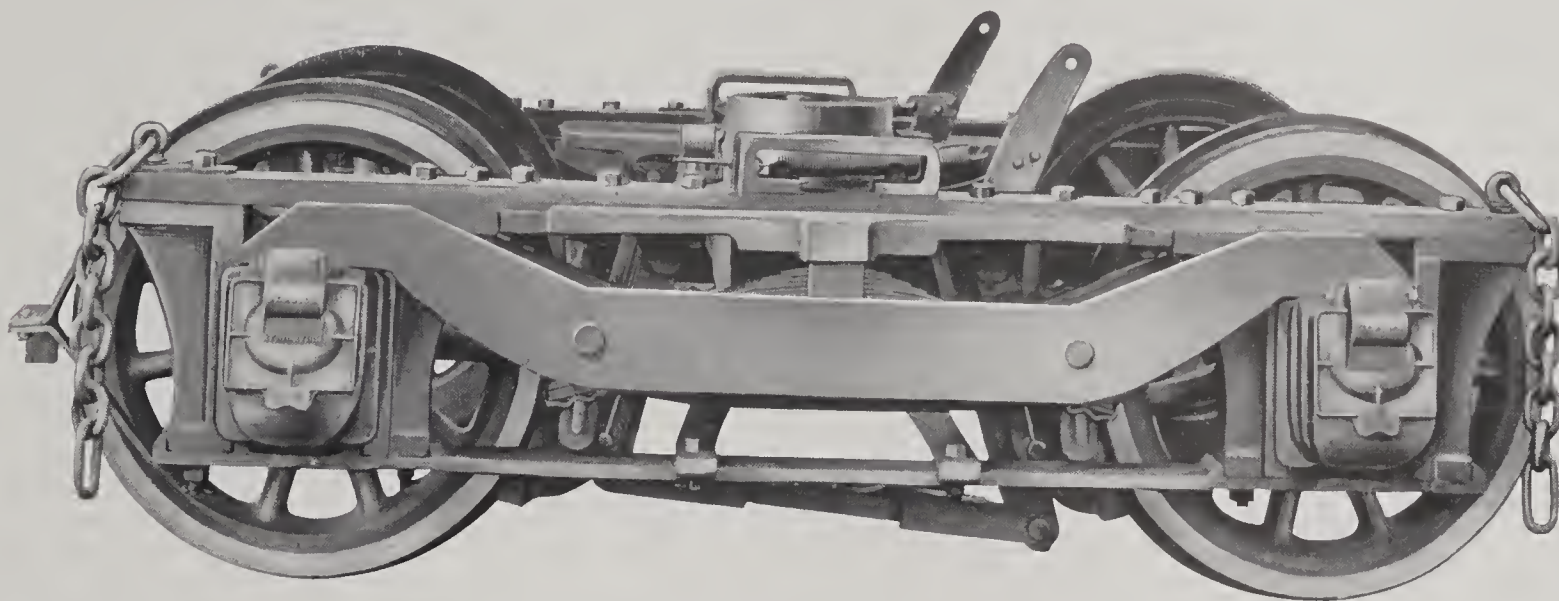


ELECTRIC LOCOMOTIVE MOTOR TRUCK

BUILT FOR BUSH TERMINAL COMPANY

Gauge of Track . . .	4 feet 8 1/2 inches	Load carried at Center Plate	18,200 pounds	Wheels	36 inches, diameter
Wheel Base	6 feet 6 inches	Weight without Motors, Wheels or Axles	7,200 pounds	Axles	5 1/4 inches, diameter
Total Length	8 feet 10 inches	Weight complete, without Motors	11,600 pounds	Journals	5 1/2 x 10 inches

AMERICAN LOCOMOTIVE COMPANY



ELECTRIC LOCOMOTIVE MOTOR TRUCK

BUILT FOR BUSH TERMINAL COMPANY

CODE WORD "ALMUEDANO"

AMERICAN LOCOMOTIVE COMPANY



NEW YORK CENTRAL & HUDSON RIVER RAILROAD COMPANY'S MOTOR CAR

MOUNTED ON AMERICAN LOCOMOTIVE COMPANY'S MOTOR AND TRAILER TRUCKS

Length of Car Body over Bumpers	60 feet	Load carried at Center Plate	Motor Truck	40,000 pounds
Seating capacity	64 passengers	Maximum speed operated	Trailer Truck	38,000 pounds
				55 miles per hour

AMERICAN LOCOMOTIVE COMPANY



NEW YORK, NEW HAVEN & HARTFORD RAILROAD COMPANY'S MOTOR CAR

MOUNTED ON AMERICAN LOCOMOTIVE COMPANY'S TYPE B-592 "HIGH SPEED" MOTOR TRUCKS

Length of Car Body over all	68 feet 8 inches	Load carried at each Center Plate	53,250 pounds
Seating capacity	51 passengers	Maximum speed operated	50 miles per hour

AMERICAN LOCOMOTIVE COMPANY

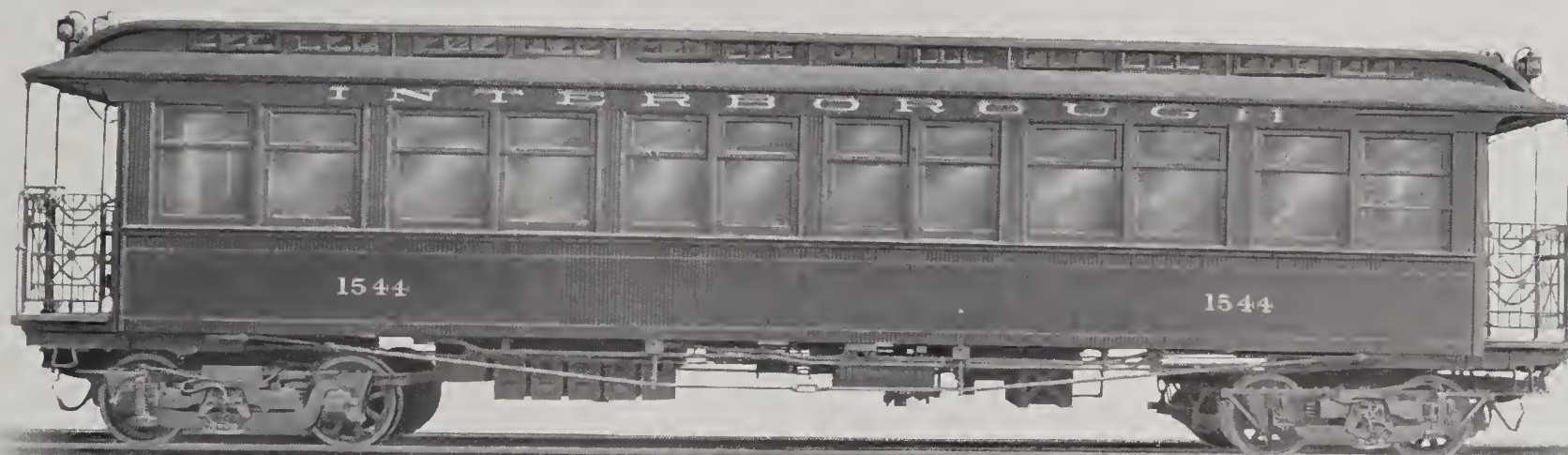


MILWAUKEE NORTHERN RAILWAY COMPANY'S MOTOR CAR
MOUNTED ON AMERICAN LOCOMOTIVE COMPANY'S TYPE Z-280 "HIGH SPEED" TRUCKS

Length of Car Body over Buffers	50 feet 4 inches	Load carried at each Center Plate	25,000 pounds
Seating capacity	52 passengers	Maximum speed operated	56 miles per hour

AMERICAN LOCOMOTIVE COMPANY

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INTERBOROUGH RAPID TRANSIT COMPANY'S ELEVATED MOTOR CAR
MOUNTED ON AMERICAN LOCOMOTIVE COMPANY'S TYPE Z-372 "HIGH SPEED" MOTOR TRUCK

Length of Car over Buffers	47 feet 4 inches	Load carried at each Center Plate	26,000 pounds
Seating capacity	48 passengers	Maximum speed operated	42 miles per hour

AMERICAN LOCOMOTIVE COMPANY



BROOKLYN RAPID TRANSIT COMPANY'S ELEVATED MOTOR CAR

MOUNTED ON AMERICAN LOCOMOTIVE COMPANY'S TYPE Z-380 "HIGH SPEED" MOTOR TRUCK

Length of Car over Platforms	48 feet 11 inches	Load carried at each Center Plate	28,500 pounds
Seating capacity	53 passengers	Maximum speed operated	40 miles per hour

AMERICAN LOCOMOTIVE COMPANY



GAS-ELECTRIC MOTOR CAR BUILT BY THE GENERAL ELECTRIC COMPANY
MOUNTED ON AMERICAN LOCOMOTIVE COMPANY'S TYPE Z-276 "HIGH SPEED" MOTOR TRUCKS

Length of Car over all	50 feet	Seating capacity	44 passengers
Load carried at each Center Plate {	Front Truck	26,000 pounds	
	Rear Truck	18,500 pounds	

AMERICAN LOCOMOTIVE COMPANY



HUDSON VALLEY RAILWAY COMPANY'S MOTOR CAR

MOUNTED ON AMERICAN LOCOMOTIVE COMPANY'S TYPE A-378 "HIGH SPEED" MOTOR TRUCKS

Length of Car Body	44 feet 6 inches	Load carried at each Center Plate	21,000 pounds
Seating capacity	42 passengers	Maximum speed operated	50 miles per hour

AMERICAN LOCOMOTIVE COMPANY



THE EASTERN OHIO TRACTION COMPANY'S MOTOR CAR
MOUNTED ON AMERICAN LOCOMOTIVE COMPANY'S TYPE A-378 "HIGH SPEED" MOTOR TRUCKS

Length of Car Body over all	45 feet	Load carried at each Center Plate	24,000 pounds
Seating capacity	46 passengers	Maximum speed operated	50 miles per hour

AMERICAN LOCOMOTIVE COMPANY



THE MARYLAND ELECTRIC RAILWAYS' MOTOR CAR
MOUNTED ON AMERICAN LOCOMOTIVE COMPANY'S TYPE B-380 "HIGH SPEED" TRUCKS

Length of Car Body	56 feet	Load carried at each Center Plate	32,500 pounds
Seating capacity	58 passengers	Maximum speed operated	60 miles per hour

AMERICAN LOCOMOTIVE COMPANY



DAYTON & TROY ELECTRIC RAILWAY COMPANY'S MOTOR CAR
MOUNTED ON AMERICAN LOCOMOTIVE COMPANY'S TYPE B-384 "HIGH SPEED" MOTOR TRUCKS

Length of Car Body over all	49 feet	Load carried at each Center Plate	30,000 pounds
Seating capacity	36 passengers	Maximum speed operated	65 miles per hour

AMERICAN LOCOMOTIVE COMPANY



PEOPLE'S RAILWAY COMPANY'S MOTOR CAR

MOUNTED ON AMERICAN LOCOMOTIVE COMPANY'S TYPE K-258 "SHORT WHEEL BASE" TRUCKS

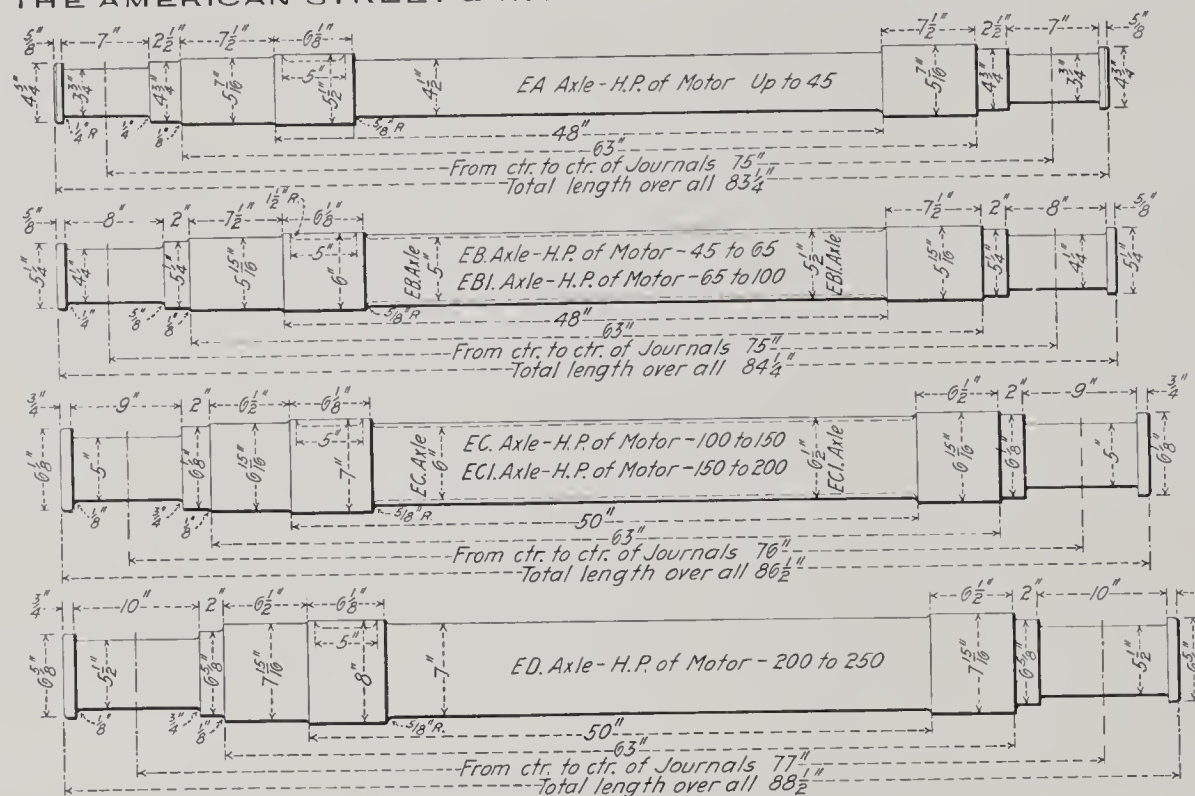
Length of Car Body	32 feet	Load carried at each Center Plate	18,000 pounds
Seating capacity	45 passengers	Maximum speed operated	10 miles per hour

Electric Railway Equipment Data

AMERICAN LOCOMOTIVE COMPANY

Standard Motor Axles

ADOPTED BY THE AMERICAN STREET & INTERURBAN RAILWAY ENGINEERING ASSOCIATION AND
APPROVED BY THE AMERICAN STREET & INTERURBAN RAILWAY ASSOCIATION, OCTOBER, 1907



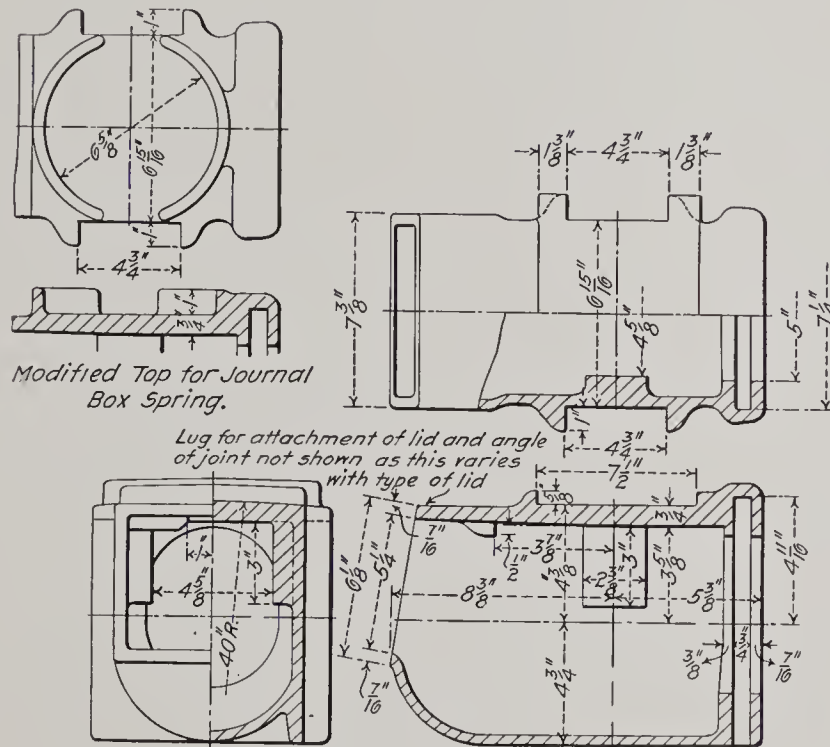
SUMMARY OF AXLE AND GEAR DATA

Type	Journals Inches	Diameter of Motor Fit Inches	Diameter of Gear Fit Inches	Diameter of Wheel Fit Inches	Distance Between Hubs Inches	Centers of Journals Inches	Maximum Capacity Pounds	Horse- power of Motor	Length of Gear Seat Inches	Gear Pitch	Gear Face Inches	Diameter of Gear Hub and Motor Bearing Flange Inches	Finished Width Gear Hubs Inches		Approximate Weight Pounds
													Wheel Side	Motor Side	
EA	3 3/4 x 7	4 1/2	5 1/2	5 7/8	48	75	15,000	45	6 1/8	3	5	8	1	1 1/8	450
EB	4 1/4 x 8	5	6	5 15/16	48	75	19,000	45-65	6 1/8	3	5	8	1	1 1/8	530
EB1	4 1/4 x 8	5 1/2	6	5 15/16	48	75	22,000	65-100	6 1/8	3	5	8	1	1 1/8	580
EC	5 x 9	6	7	6 15/16	50	76	27,000	100-150	6 1/8	2 1/2	5 1/4	9 1/2	1 1/8	3/4	750
EC1	5 x 9	6 1/2	7	6 15/16	50	76	31,000	150-200	6 1/8	2 1/2	5 1/4	9 1/2	1 1/8	3/4	820
ED	5 1/2 x 10	7	8	7 15/16	50	77	38,000	200-250	6 1/8	2 1/2	5 1/4	10 1/2	1 1/8	3/4	1050

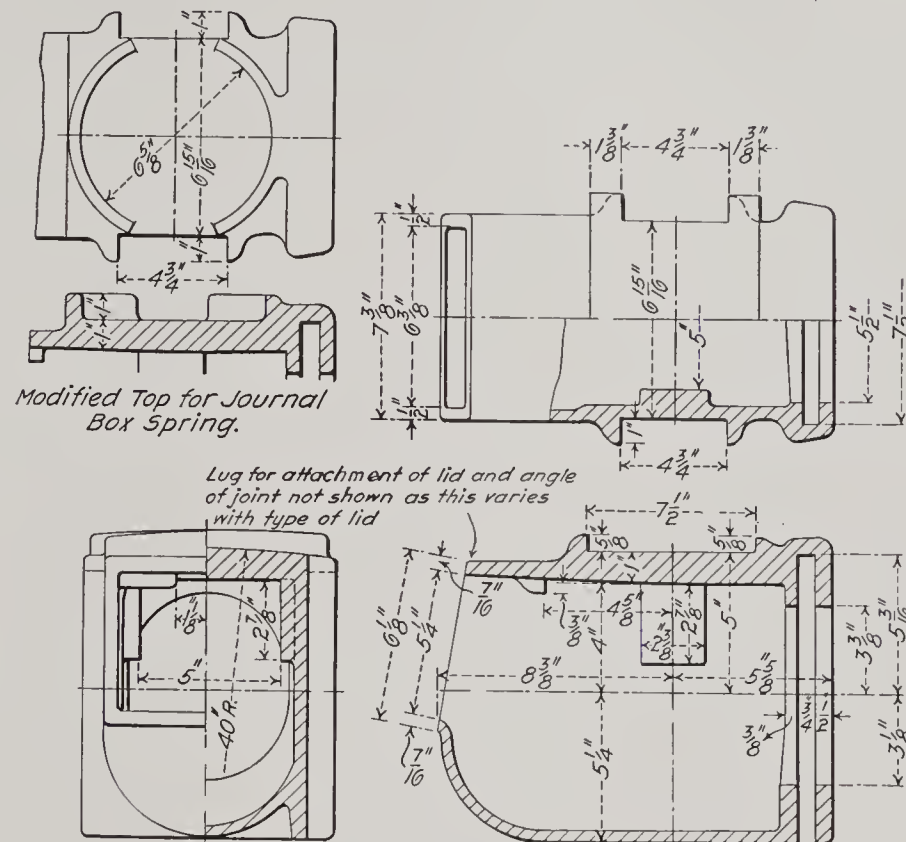
AMERICAN LOCOMOTIVE COMPANY

Standard Electric Truck Journal Boxes

ADOPTED BY THE AMERICAN STREET & INTERURBAN RAILWAY ENGINEERING ASSOCIATION AND
APPROVED BY THE AMERICAN STREET & INTERURBAN RAILWAY ASSOCIATION, OCTOBER, 1907



Journal Box for $3\frac{3}{4} \times 7$ Journal

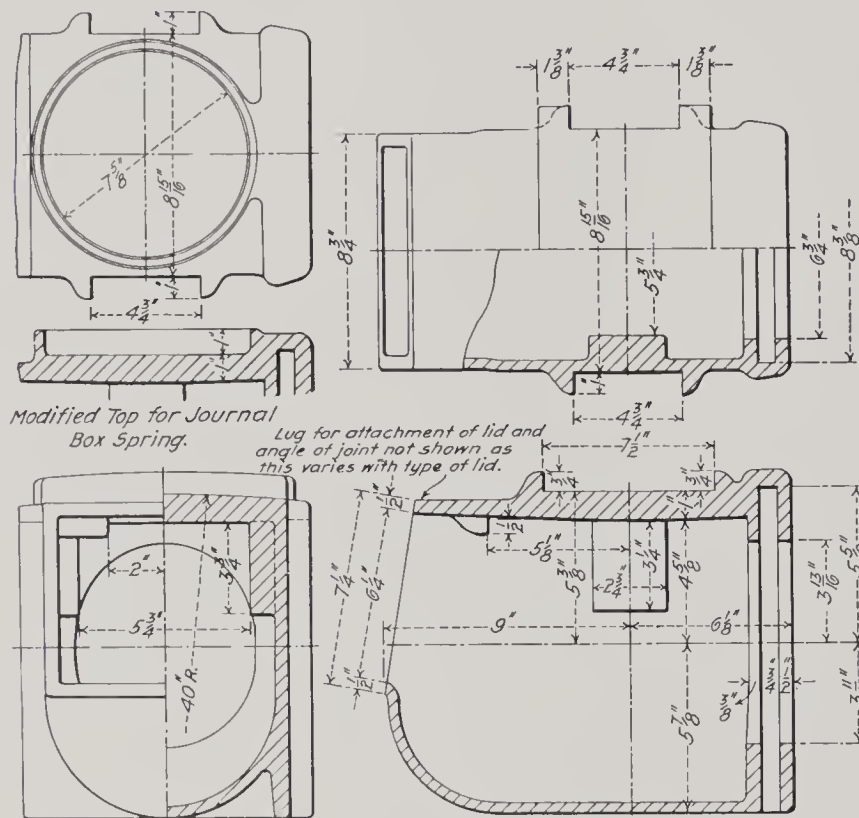


Journal Box for $4\frac{1}{2} \times 8$ Journal

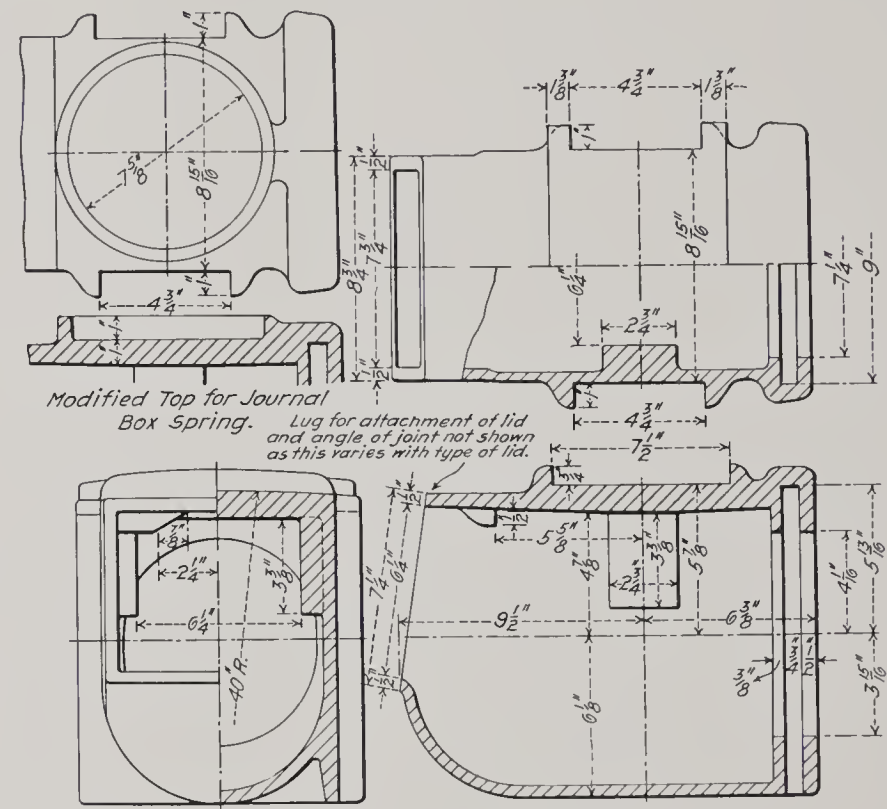
AMERICAN LOCOMOTIVE COMPANY

Standard Electric Truck Journal Boxes

ADOPTED BY THE AMERICAN STREET & INTERURBAN RAILWAY ENGINEERING ASSOCIATION AND
APPROVED BY THE AMERICAN STREET & INTERURBAN RAILWAY ASSOCIATION, OCTOBER, 1907



Journal Box for 5 x 9 Journal

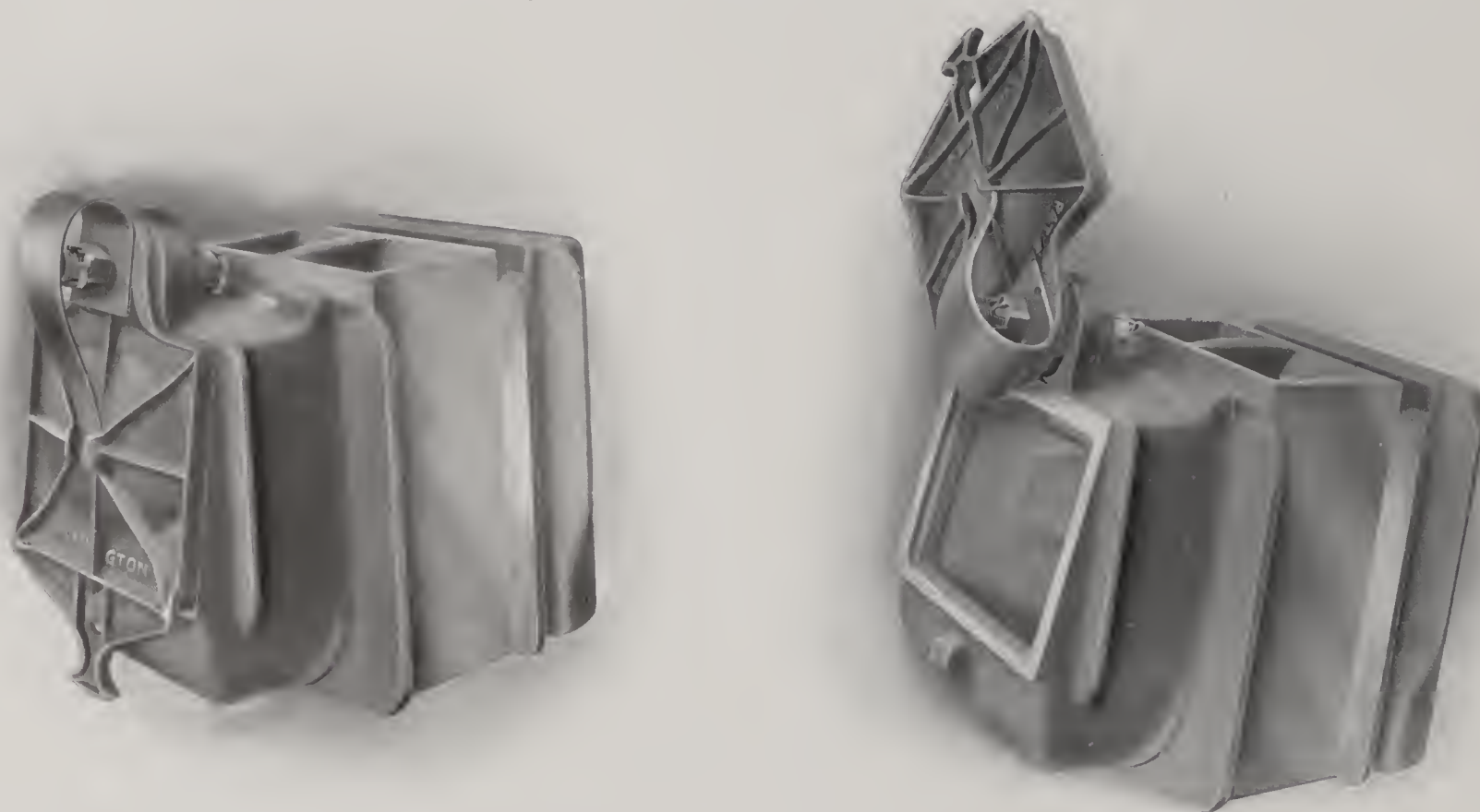


Journal Box for 5 1/2 x 10 Journal

AMERICAN LOCOMOTIVE COMPANY

Semi-Steel Electric Truck Journal Boxes

MANUFACTURED BY
T. H. SYMINGTON COMPANY

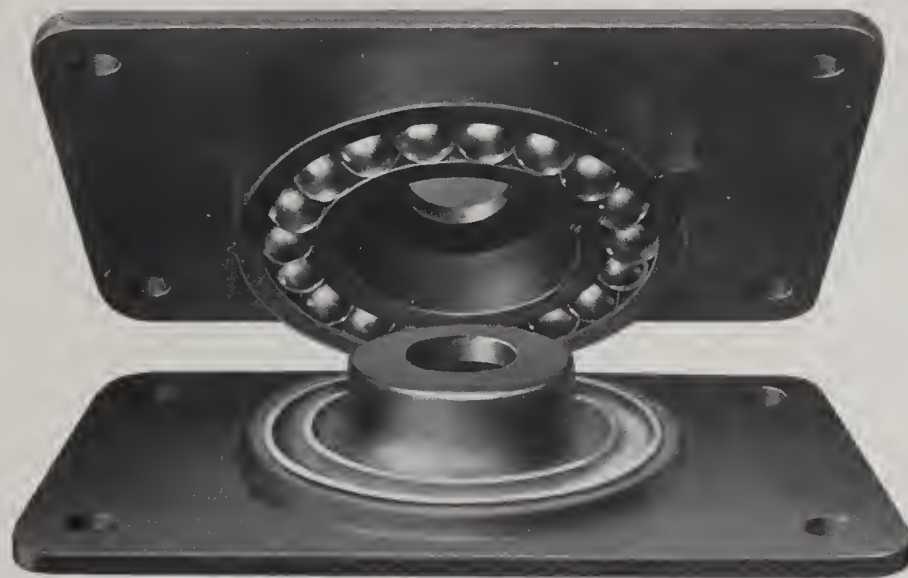


WEIGHTS OF JOURNAL BOXES

Journals	$3\frac{3}{4}$ x 7	$4\frac{1}{4}$ x 8	5 x 9	$5\frac{1}{2}$ x 10
Weight of Box, Pounds	91	96	138	159

AMERICAN LOCOMOTIVE COMPANY
Center and Side Bearings for Electric Trucks

MANUFACTURED BY
 T. H. SYMINGTON COMPANY



"Baltimore" Center-Bearing, Style "B," Capacity 40,000 Pounds.



"Baltimore" Side-Bearing, Style "E-A," 12-in. Travel.



"Baltimore" Side-Bearing, Style "E," 9-in. Travel.

CAPACITY OF CENTER BEARINGS

Style of Center-Bearing	C	B	B-A
Maximum Capacity	25,000 Lbs.	40,000 Lbs.	Over 40,000 Lbs.

AMERICAN LOCOMOTIVE COMPANY

Malleable Iron Electric Truck Journal Boxes

With Steel Inserts on Equalizer Seats and Pedestal Guides

MANUFACTURED BY

MCCORD & COMPANY

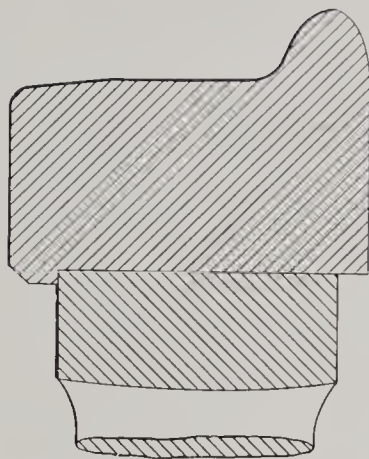


WEIGHTS OF JOURNAL BOXES

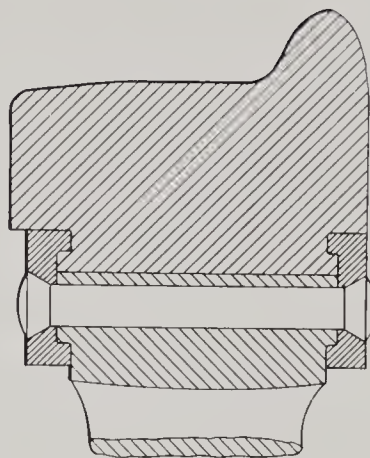
Journals	$3\frac{3}{4} \times 7$	$4\frac{1}{4} \times 8$	5×9	$5\frac{1}{2} \times 10$
Weight of Box, Pounds	63	67	98	105

AMERICAN LOCOMOTIVE COMPANY

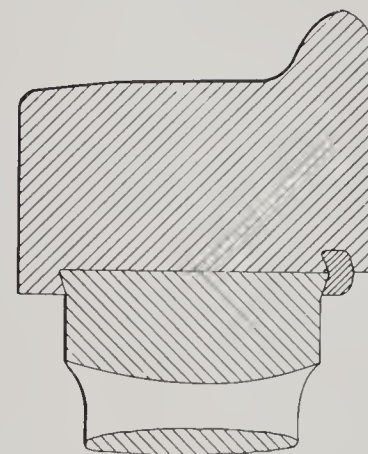
Styles of Tire Fastenings



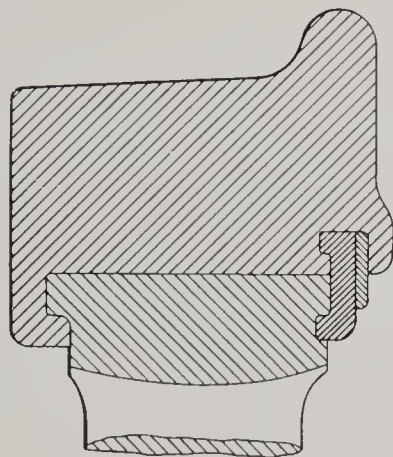
A. L. Co.'s Lipped Fastening



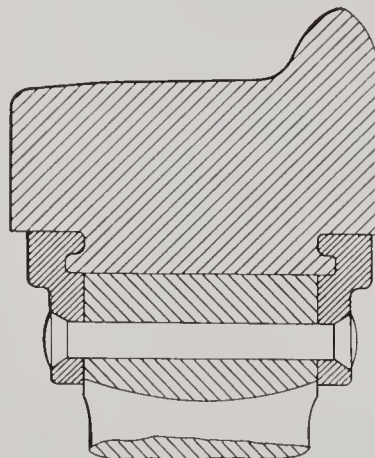
A. L. Co.'s Double Lip Ring



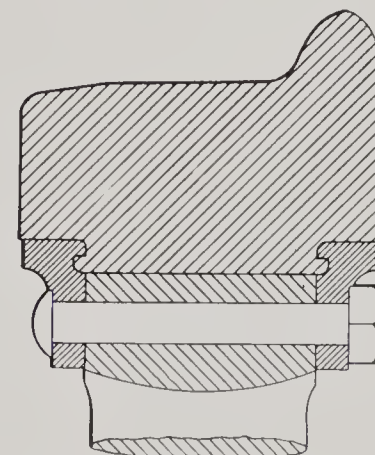
Gibson Ring



Carlton-Stroudley Fastening



Mansell Ring with Countersunk Rivet



Mansell Ring with Bolt and Nut

AMERICAN LOCOMOTIVE COMPANY

Weights of Steel Tired Motor Truck Wheels

MANUFACTURED BY

RAILWAY STEEL-SPRING COMPANY



Motor Wheel No. 304



Motor Wheel No. 307



Motor Wheel No. 308



Fused Motor Wheel

APPROXIMATE WEIGHTS IN POUNDS

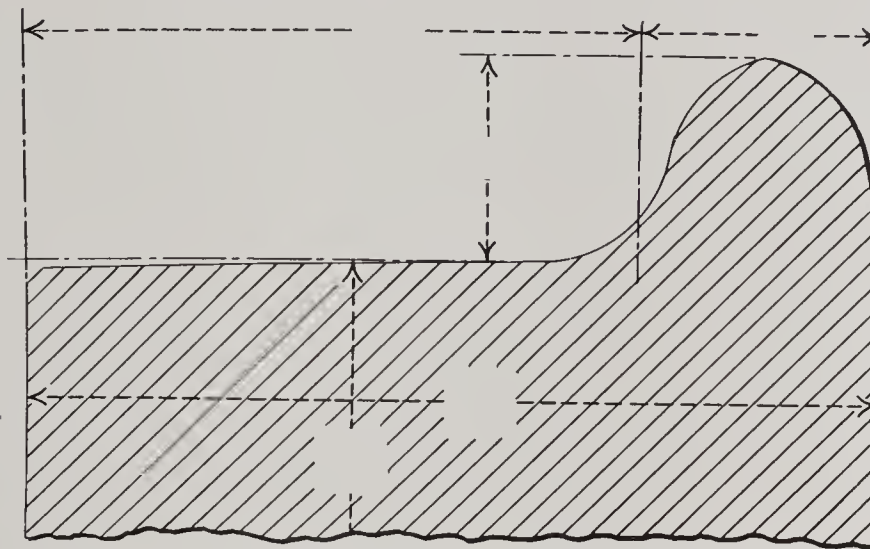
Tire Dimensions	3 $\frac{1}{2}$ " Wide 2 $\frac{1}{2}$ " Thick			3 $\frac{3}{4}$ " Wide 2 $\frac{1}{2}$ " Thick			4" Wide 2 $\frac{1}{2}$ " Thick			4 $\frac{1}{4}$ " Wide 2 $\frac{1}{2}$ " Thick			4 $\frac{3}{4}$ " Wide 2 $\frac{1}{2}$ " Thick			5" Wide 2 $\frac{1}{2}$ " Thick		
Diameter of Wheel	33	34	37	33	34	37	33	34	37	33	34	37	33	34	37	33	34	37
Motor Wheel No. 304	650	680	725	670	700	745	690	720	765	715	745	800	745	780	850	765	805	885
Motor Wheel No. 307	680	715	760	710	745	790	725	765	815	750	790	860	780	820	895	800	850	925
Motor Wheel No. 308	640	670	710	660	690	735	685	710	760	700	730	800	740	775	840	760	800	865
Fused Motor Wheel	635	665	715	660	690	740	680	710	750	700	735	800	730	770	840	760	800	880

The above weights are based on spoke or plate wheels, finished bored, suitable for axles having wheel fit not over 5 inches in diameter.

AMERICAN LOCOMOTIVE COMPANY

Weights of "Latrobe" Motor Truck Wheel Tires

MANUFACTURED BY
RAILWAY STEEL-SPRING COMPANY



APPROXIMATE WEIGHTS IN POUNDS

Tire Dimensions	3½" Wide 2½" Thick			3¾" Wide 2½" Thick			4" Wide 2½" Thick			4¼" Wide 2½" Thick			4¾" Wide 2½" Thick			5" Wide 2½" Thick		
Diameter of Wheel.....	33	34	37	33	34	37	33	34	37	33	34	37	33	34	37	33	34	37
Section for M. W. 304.....	285	293	324	300	312	342	320	330	362	338	348	381	373	386	422	391	403	442
Section for M. W. 307.....	279	287	317	296	306	335	314	324	355	332	343	376	367	379	415	385	395	435
Section for M. W. 308.....	296	306	337	314	324	356	332	342	375	350	361	396	385	397	435	403	413	455

Note:—When ordering finished tires, it will be necessary to give the size of the wheel centers, or the finished inside diameter of the tires; if the wheel center size is given, the manufacturer will allow for shrinkage when boring the tires; if the finished inside diameter is given, the manufacturer understands the customer has made the necessary allowance for shrinkage.

AMERICAN LOCOMOTIVE COMPANY

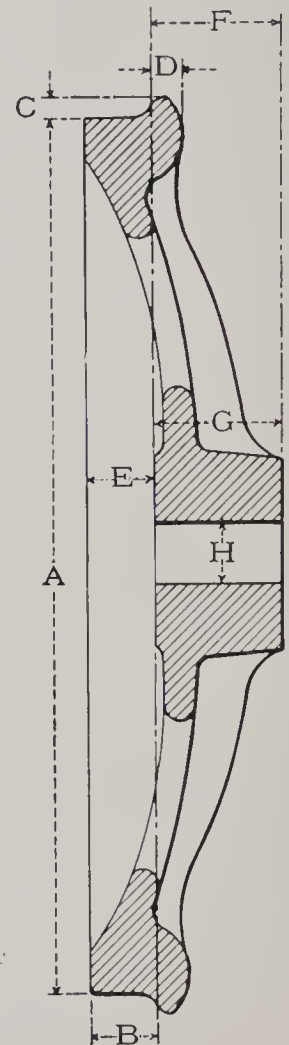
Weights of Steel Tired Motor Truck Wheels and Specifications for Cast Iron Wheels

MANUFACTURED BY
NATIONAL CAR WHEEL COMPANY

Diam. of Wheel Inches	Style of Fasten- ing	TIRE					CENTER			Weight of Finished Wheel Pounds
		Thick- ness Inches	Width of Tread Inches	FLANGE		Rough Weight Pounds	Diam- eter Inches	Rough Bore Inches	Rough Weight Pounds	
				Height Inches	Thick- ness Inches					
18	P	2	2 1/4	3/4	15/16	100	14	3 1/4	110	190
22	P	2 1/8	2 1/4	3/4	15/16	134	17 3/4	3 1/4	175	285
25	P	2 1/2	2 1/4	3/4	15/16	181	20	3 3/4	200	350
25	P	2 1/2	2 1/2	3/4	15/16	196	20	3 3/4	200	365
30	P	2	1 13/16	5/8	1	165	26	4 1/8	300	420
30	P	2 1/2	3 1/4	1 1/8	1 1/4	320	25	4 3/32	390	635
30	P	2 1/2	4 1/8	1 1/8	1 3/8	400	25	5 1/2	511	820
31 1/8	P	2 1/4	2 1/16	5/8	1 1/16	208	26 5/8	4 1/8	310	492
32	P	2 1/2	2 1/4	3/4	15/16	241	27	4 1/4	340	547
33	P	2 1/2	2 1/4	3/4	15/16	232	28	4 3/8	345	540
33	P-7	2 1/2	2 1/4	7/8	1	250	28	4 1/4	348	550
33	P-7	2 1/2	2 1/4	7/8	1	250	28	5 1/4	405	590
33	P-4	2 1/2	2 1/2	5/8	1 1/32	270	28	4 1/8	372	585
33	P	2 1/2	2 1/2	3/4	1 1/8	284	28	3 5/8	378	610
33	P	2 1/2	2 3/4	5/8	1	285	28	4 1/4	395	620
33	G	2 1/4	2 3/4	7/8	1 1/8	274	28 1/2	3 3/4	445	630
33	D-M	2 1/2	2 5/8	13/16	29/32	278	28	5 3/4	425	659
33	P	2 1/2	2 3/4	7/8	1 1/8	304	28	4 3/16	410	660
33	P	2 1/8	3	1 1/8	1 7/32	292	28 3/4	5 3/16	458	710
33	D-M	3	2 25/32	7/8	1 1/8	352	27	4 1/4	470	750
33	P	2 1/2	3 3/4	1	1 1/8	385	28	3 3/4	440	775
33	D-M	2 1/4	3 5/8	7/8	1 1/8	335	28 1/2	4 3/4	530	780
33 1/8	P	2 1/2	3	7/8	1 1/8	331	28 1/8	3 1/4	400	655

SPECIFICATIONS FOR CAST IRON WHEELS

A—Diameter
B—Width of Tread
C—Depth of Flange
D—Thickness of Flange
E—Dish of Wheel
F—Gauge Line to Back
Hub
G—Length of Hub
H—Bore or Core
Weight in Pounds



P—Plain Shrinkage Fastening and when followed by a figure indicates that set screws are also used, the figure representing the number of set screws.

D-M—Double Lip Mansell Ring.

G—Gibson Ring.

AMERICAN LOCOMOTIVE COMPANY

Weights of Steel Tired Motor Truck Wheels

MANUFACTURED BY

NATIONAL CAR WHEEL COMPANY

Diameter of Wheel Inches	Style of Fastening	TIRE				Rough Weight Pounds	CENTER			Weight of Finished Wheel Pounds
		Thickness Inches	Width of Tread Inches	Height Inches	FLANGE Thickness Inches		Diameter Inches	Rough Bore Inches	Rough Weight Pounds	
34	P	2 1/2	2 1/4	3/4	15/16	251	29	3 3/4	350	550
34	P-4	2 1/2	2 1/2	3/4	15/16	265	29	4 3/8	360	575
34	P-4	2 1/4	2 1/2	3/4	1 1/16	262	29 1/2	3 1/2	362	592
34	P-4	2 1/4	2 1/2	3/4	1 1/8	272	29 1/2	3 7/8	345	600
34	P	2 1/4	2 3/4	7/8	1 1/4	270	29 1/2	3 7/8	370	605
34	P	2 1/2	2 3/4	7/8	1 1/4	300	29	4 7/8	375	625
34	G	2 1/2	2 3/4	1 1/16	1 1/16	312	29	4 3/8	385	650
34	P	2 1/2	2 1/2	3/4	1 3/16	285	29	4 1/4	400	655
34	G	2 1/4	2 1/2	3/4	1 1/16	275	29 1/2	5	450	669
34	P-4	2 1/2	2 13/16	3/4	1	311	29	4	412	680
34	P	2 1/2	2 1/2	3/4	1 1/16	293	29	5 1/8	460	690
34	D-M	3	2 3/4	7/8	1 1/8	365	28	4 3/4	405	711
34	P-8	2 1/2	3	3/4	1 1/8	335	29	4 5/16	450	730
34	G	2 1/2	2 7/8	7/8	1 1/8	317	29	5 1/4	520	743
34	P-4	2 1/2	3 1/2	7/8	1	350	29	4 1/2	460	745
34	P	2 1/2	3	7/8	1	320	29	6 1/2	500	775
34	P-4	2 1/2	3 3/8	7/8	1 1/8	363	29	5 3/8	510	810
34	P-4	2 1/2	3	1 1/8	1 3/8	362	29	5 3/8	495	810
34	D-M	3	3	1	1 1/4	403	28	4 3/4	540	825
34 1/2	P	2 3/8	2 7/8	7/8	1 1/8	310	29 3/4	4 3/4	400	650
34 1/2	G	3	3	7/8	1 1/4	411	28 1/2	4 3/4	500	810
36	P	2 1/2	3	1 1/8	1 3/8	375	31	...	565	880
36	P	3	3	1 1/8	1 3/8	425	30	...	520	885

P—Plain Shrinkage Fastening and when followed by a figure indicates that set screws are also used, the figure representing the number of set screws.

D-M—Double Lip Mansell Ring.

G—Gibson Ring.

AMERICAN LOCOMOTIVE COMPANY

Data on Cast Iron Street Car Wheels

MANUFACTURED BY
GRIFFIN WHEEL COMPANY

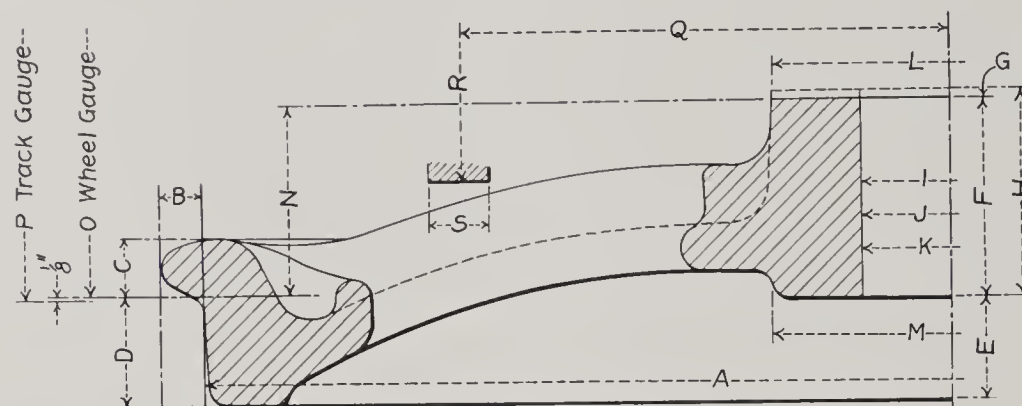
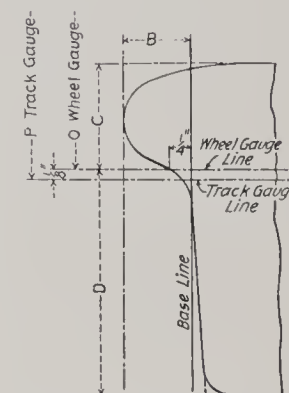


TABLE OF DIMENSIONS USED WHEN ORDERING STREET CAR WHEELS

Dimension	Description	Dimension	Description
A	Diameter of Wheel	L	Diameter of Back Hub
B	Height of Flange	M	Diameter of Front Hub
C	Thickness of Flange	N	Distance from Gauge Line to Back of Finished Hub
D	Width of Tread	O	Wheel Gauge
E	Dish of Wheel	P	Track Gauge
F	Distance through Finished Hub	Q	Distance from C. L. of Wheel to C. L. of Motor Casing
G	Distance between Finished Hubs	R	Distance from Outside to Outside of Motor Casing
H	Distance through Rough Hub	S	Width of Motor Casing
I	Diameter of Core		
J	Diameter of Rough Bore		
K	Diameter of Finished Bore		



Method of Gauging Street Car Wheels

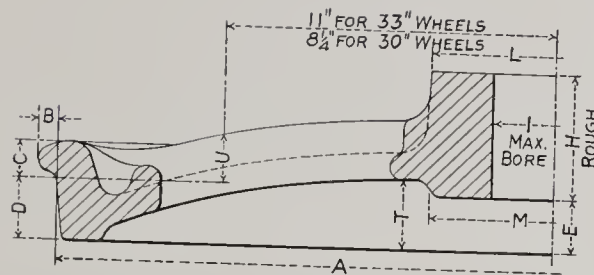


Section of Channel Spoke

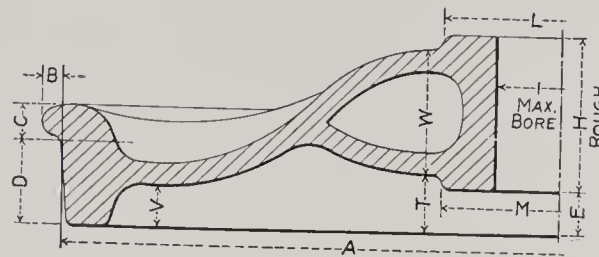
AMERICAN LOCOMOTIVE COMPANY

Weights of Cast Iron Motor Truck Wheels

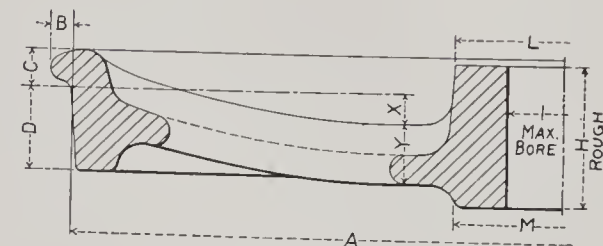
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Section of C. A. C. S. R. Wheel



Section of D. P. Wheel



Section of R. D. C. A. C. S. Wheel

Wheel No.	Diam. of Wheel	Weight of Wheel	Type of Wheel	DIMENSIONS, INCHES										
	Inches	Pounds		A	B	C	D	E	H	I	L	M	T	U
1	20	180	5. C. A. C. S.	20	$\frac{3}{4}$	$1\frac{3}{32}$	2	$1\frac{13}{4}$	$4\frac{1}{2}$	$3\frac{3}{4}$	7	7	$2\frac{3}{8}$	...
2	22	220	7. C. A. C. S.	22	$\frac{3}{4}$	$1\frac{3}{32}$	2	$1\frac{13}{4}$	$4\frac{1}{2}$	$3\frac{3}{4}$	7	7	$2\frac{3}{8}$	...
3	24	230	7. C. A. C. S.	24	$\frac{3}{4}$	$1\frac{3}{32}$	2	$1\frac{13}{4}$	$4\frac{1}{2}$	$3\frac{3}{4}$	7	7	$2\frac{3}{8}$	...
4	30	320	7. C. A. C. S.	30	$\frac{3}{4}$	$1\frac{3}{32}$	2	$1\frac{13}{4}$	$4\frac{1}{2}$	$3\frac{3}{4}$	7	7	$2\frac{3}{8}$	...
5	30	365	7. C. A. C. S.	30	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{1}{4}$	2	$4\frac{1}{2}$	$3\frac{3}{4}$	7	7	$2\frac{3}{8}$	$2\frac{1}{4}$
*6	30	365	7. C. A. C. S.	30	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{1}{4}$	2	$4\frac{1}{2}$	4	$7\frac{3}{4}$	$7\frac{3}{4}$	$2\frac{5}{8}$	$2\frac{1}{4}$
7	30	415	7. C. A. C. S.	30	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{1}{4}$	2	$4\frac{1}{2}$	4	$7\frac{3}{4}$	$7\frac{3}{4}$	2	$1\frac{7}{16}$
8	30	480	7. C. A. C. S.	30	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{3}{4}$	$2\frac{1}{2}$	$5\frac{1}{2}$	$4\frac{1}{4}$	8	8	$2\frac{1}{2}$	$2\frac{1}{2}$
9	33	400	8. C. A. C. S.	33	$\frac{3}{4}$	$1\frac{5}{32}$	2	$1\frac{13}{4}$	$4\frac{1}{2}$	4	8	9	$3\frac{1}{8}$	$2\frac{3}{4}$
*10	33	400	8. C. A. C. S.	33	$\frac{3}{4}$	$1\frac{5}{32}$	2	$1\frac{13}{4}$	$4\frac{1}{2}$	4	8	8	$2\frac{3}{8}$	$1\frac{3}{4}$
11	33	425	8. C. A. C. S. R.	33	$\frac{3}{4}$	$1\frac{5}{32}$	2	$1\frac{13}{4}$	$4\frac{1}{2}$	4	8	8	$1\frac{3}{4}$	$1\frac{3}{8}$
*12	33	425	8. C. A. C. S. R.	33	$\frac{3}{4}$	$1\frac{5}{32}$	2	$1\frac{13}{4}$	$4\frac{3}{4}$	$4\frac{1}{4}$	$8\frac{1}{2}$	$8\frac{1}{2}$	$2\frac{3}{8}$	$2\frac{1}{16}$
*13	33	450	8. C. A. C. S. R.	33	$\frac{3}{4}$	$1\frac{5}{32}$	2	$1\frac{13}{4}$	$4\frac{3}{4}$	$4\frac{1}{4}$	$8\frac{1}{2}$	$8\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{7}{16}$
14	33	475	8. C. A. C. S. R.	33	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{3}{8}$	$2\frac{1}{8}$	5	$4\frac{1}{2}$	$8\frac{1}{2}$	9	9	$2\frac{3}{4}$

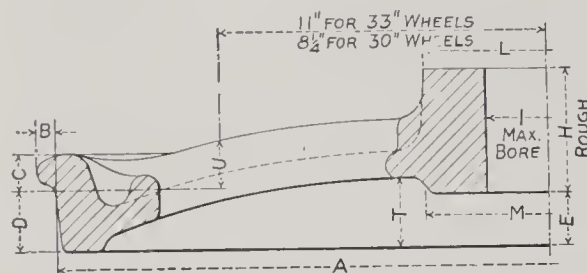
C. A. C. S.—Curved Arm Channel Spoke; C. A. C. S. R.—Curved Arm Channel Spoke with Reinforcement back of flange; D. P.—Double Plate; R. of flange. For each 1/4" increase or decrease in height of flange 5 pounds should be added to or deducted from weight of wheel; and 10 pounds added or deducted for each 1/4" increase or decrease in width of tread.

*For special clearance between brackets.

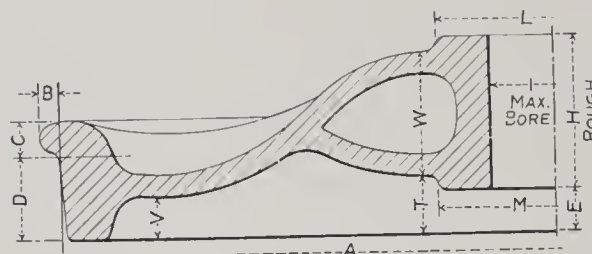
AMERICAN LOCOMOTIVE COMPANY

Weights of Cast Iron Motor Truck Wheels

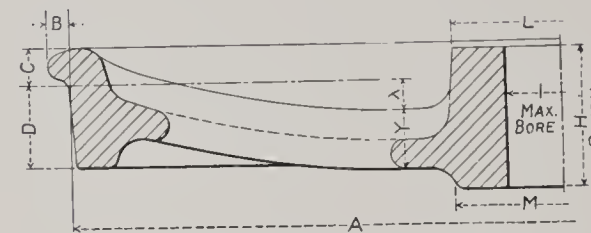
MANUFACTURED BY
GRIFFIN WHEEL COMPANY



Section of C. A. C. S. R. Wheel



Section of D. P. Wheel



Section of R. D. C. A. C. S. Wheel

Wheel No.	Diam. of Wheel		Type of Wheel	DIMENSIONS, INCHES														
	Inches	Pounds		A	B	C	D	E	H	I	L	M	T	U	V	W	X	Y
*15	33	475	S. C. A. C. S. R.	33	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{3}{8}$	$2\frac{1}{8}$	5	$4\frac{1}{2}$	9	9	$2\frac{1}{8}$	$1\frac{7}{16}$	...	...	...	...
16	33	500	S. C. A. C. S. R.	33	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{1}{2}$	$2\frac{1}{4}$	$5\frac{1}{2}$	5	10	10	$2\frac{7}{8}$	$2\frac{1}{8}$	...	...	...	...
*17	33	500	S. C. A. C. S. R.	33	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{1}{2}$	$2\frac{1}{4}$	$5\frac{1}{2}$	5	10	10	$2\frac{1}{4}$	$1\frac{7}{16}$	...	...	...	...
18	36	550	S. C. A. C. S. R.	36	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{1}{4}$	2	5	$4\frac{1}{2}$	9	9	$2\frac{11}{16}$	$2\frac{9}{16}$	...	...	...	...
19	36	600	S. C. A. C. S. R.	36	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{1}{2}$	2	6	$5\frac{1}{2}$	$10\frac{1}{2}$	$10\frac{1}{2}$	$2\frac{7}{8}$	$2\frac{5}{8}$	...	...	...	...
20	36	660	R. D. C. A. C. S.	36	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{3}{4}$	2	$6\frac{1}{4}$	6	11	11	$3\frac{1}{8}$	$2\frac{5}{8}$	...	...	...	...
21	33	500	D. P.	33	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{1}{2}$	$5\frac{5}{8}$	6	$5\frac{3}{4}$	10	10	$1\frac{1}{16}$	...	$1\frac{7}{16}$	5	...	...
22	33	500	D. P.	33	$\frac{3}{4}$	$1\frac{5}{32}$	3	$1\frac{1}{2}$	6	$5\frac{1}{2}$	10	10	2	...	$1\frac{1}{2}$	$4\frac{9}{16}$	...	...
23	33	525	D. P.	33	$\frac{3}{4}$	$1\frac{5}{32}$	3	$1\frac{1}{2}$	$6\frac{1}{2}$	$6\frac{1}{2}$	11	11	2	...	$1\frac{1}{2}$	$4\frac{3}{4}$	...	...
24	30	385	R. D. C. A. C. S.	30	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{1}{4}$	...	$4\frac{3}{4}$	$4\frac{1}{4}$	8	8	...	...	...	...	$\frac{5}{16}$	$2\frac{3}{8}$
25	30	400	R. D. C. A. C. S.	30	$\frac{3}{4}$	$1\frac{5}{32}$	3	...	$4\frac{3}{4}$	$4\frac{1}{4}$	8	8	...	...	...	...	$\frac{5}{16}$	$2\frac{3}{8}$
26	33	415	R. D. C. A. C. S.	33	$\frac{3}{4}$	$1\frac{5}{32}$	2	...	$4\frac{1}{2}$	4	8	9	...	...	...	...	$\frac{3}{4}$	$2\frac{1}{16}$
27	33	430	R. D. C. A. C. S.	33	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{1}{2}$	...	5	$4\frac{1}{2}$	9	9	...	...	...	...	$\frac{3}{4}$	$2\frac{1}{16}$
28	33	450	R. D. C. A. C. S.	33	$\frac{3}{4}$	$1\frac{5}{32}$	$2\frac{1}{2}$	...	5	$4\frac{1}{2}$	9	9	...	...	...	...	$1\frac{1}{2}$	$2\frac{1}{16}$

C. A. C. S.—Curved Arm Channel Spoke; C. A. C. S. R.—Curved Arm Channel Spoke with Reinforcement back of flange; D. P.—Double Plate; R. D. C. A. C. S.—Reverse Dish Wheel with Curved Arm Channel Spoke. The weights of the above wheels are figured with $\frac{3}{4}$ " height and $1\frac{5}{32}$ " thickness of flange. For each $\frac{1}{4}$ " increase or decrease in height 5 pounds should be added to or deducted from weight of wheel; and 10 pounds added or deducted for each $\frac{1}{4}$ " increase or decrease in width of tread.

*For special clearance between brackets.

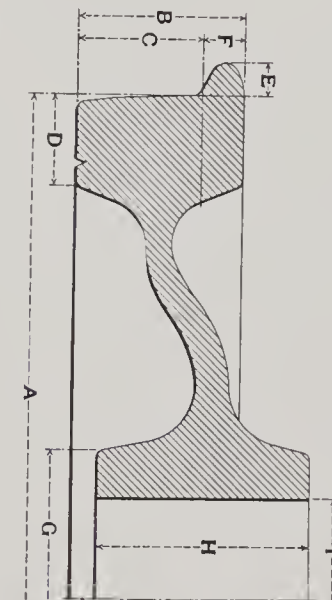
AMERICAN LOCOMOTIVE COMPANY

Weights of Solid Forged and Rolled Steel Motor Truck Wheels

MANUFACTURED BY

CARNEGIE STEEL COMPANY

DIMENSIONS, INCHES									Weight
A	B	C	D	E	F	G	H	I	Pounds
30	5½	4⅛	2⅝	1⅛	1⅜	8	7½	To suit	655
31	5½	4⅛	3	1⅛	1⅜	9	6½	To suit	725
31	3⅛	2	3	⅝	1⅛	7	4	To suit	463
33	5½	4⅛	1½	1	1⅜	8½	6½	To suit	730
33	4¼	3	2½	⅞	1¼	9	4⅝	To suit	613
33	3⅝	2⅝	3	⅝	1	8½	4⅞	To suit	590
33	3⅔	2⅔	3½	¾	1	7	4¾	To suit	600
34	4⅞	3	2½	⅞	1⅜	8½	5	To suit	642
34	4⅞	3	3½	⅞	1⅜	8½	5	To suit	780
34	5½	4⅛	3	1⅛	1⅜	11	6	To suit	880
36	4¼	3	3	⅝	1¼	10	5¾	To suit	872
36	5½	4⅛	3	1	1⅜	9⅞	7	To suit	950
37	4¼	3⅞	3	⅝	1⅜	10	5¾	To suit	925
37¼	4⅞	3½	3½	⅞	1⅞	9⅞	7	To suit	980
37⅔	5⅞	3⅞	2⅞	1⅛	1⅜	9¼	7⅞	To suit	1010

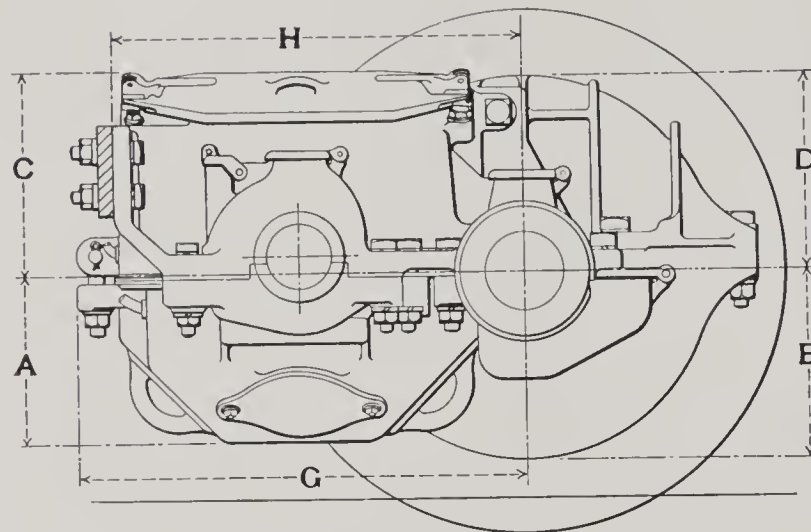


- A—Diameter of wheel
- B—Width of rim
- C—Width of tread
- D—Thickness of rim
- E—Height of flange
- F—Thickness of flange
- G—Diameter of hub
- H—Length of hub
- I—Rough bore

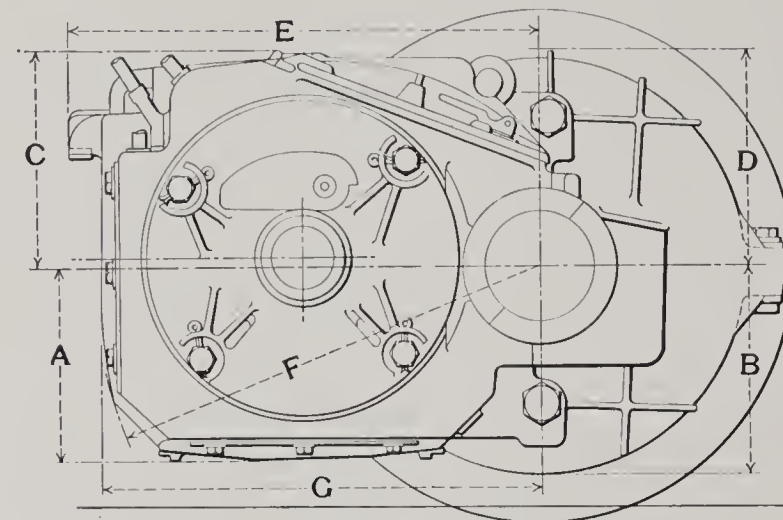
AMERICAN LOCOMOTIVE COMPANY

Types of Motor Suspension

GENERAL ELECTRIC COMPANY



Nose or Yoke Suspension



Nose Suspension

INDEX OF DIMENSIONS GIVEN IN TABLE ON OPPOSITE PAGE

Dimension	Description	Dimension	Description
A	Depth from center of axle to bottom of motor	E	Length from center of axle over nose (nose suspension)
B	Depth from center of axle to bottom of gear cover	F	Swinging clearance
C	Height from center of axle to top of motor	G	Length from center of axle over motor (suspension end)
D	Height from center of axle to top of gear cover	H	Length from center of axle over face of suspension boss (nose or yoke suspension)

AMERICAN LOCOMOTIVE COMPANY

Principal Dimensions of Street Railway Motors

MANUFACTURED BY
GENERAL ELECTRIC COMPANY

No. of Motor	Type of Motor	Type of Suspension	Horse Power	Weight Pounds	Min. Space Taken on Axle Inches	DIMENSIONS, INCHES								WHEEL BASE REQUIRED, INCHES			Min. Diam. of Wheels Allow- able Inches	Max. Diam. of Axle Inches
						A	B	C	D	E	F	G	H	8" Bolster Double Ell. Springs	10" Bolster Double Ell. Springs	12" Bolster Triple Ell. Springs		
G.E.52A	Split	Nose (Yoke)	25	1725	45 $\frac{7}{8}$	10 $\frac{5}{8}$	11 $\frac{7}{8}$	11 $\frac{7}{8}$	12 $\frac{1}{4}$	...	...	26 $\frac{1}{2}$	24 $\frac{1}{4}$	72	...	...	32	4 $\frac{1}{2}$
G.E.54A	Split	Nose (Yoke)	25	1831	45 $\frac{7}{8}$	10 $\frac{5}{8}$	11 $\frac{7}{8}$	11 $\frac{7}{8}$	12 $\frac{1}{4}$	...	...	26 $\frac{1}{2}$	24 $\frac{1}{4}$	72	...	...	32	4 $\frac{1}{2}$
G.E.81A	Split	Nose (Yoke)	30	1949	46 $\frac{1}{4}$	10 $\frac{5}{8}$	11 $\frac{7}{8}$	10 $\frac{13}{16}$	12 $\frac{1}{4}$	...	...	26 $\frac{1}{2}$	24 $\frac{3}{4}$	72	...	...	32	4 $\frac{1}{2}$
G.E.67A	Split	Nose (Yoke)	35	2478	45 $\frac{1}{2}$	12	12 $\frac{3}{16}$	13 $\frac{1}{2}$	12 $\frac{3}{8}$	...	...	29	26 $\frac{3}{4}$	78	...	...	33	4 $\frac{1}{2}$
G.E.78A	Split	Nose (Yoke)	35	2560	48	11 $\frac{7}{8}$	12 $\frac{5}{16}$	12 $\frac{7}{8}$	12 $\frac{5}{8}$	...	...	28 $\frac{7}{8}$	26 $\frac{3}{4}$	78	...	...	33	4 $\frac{1}{2}$
G.E.58A	Split	Nose (Yoke)	37	2163	37 $\frac{1}{4}$	12 $\frac{1}{4}$	12 $\frac{1}{4}$	13 $\frac{5}{8}$	12 $\frac{3}{8}$	...	...	29 $\frac{1}{2}$	27 $\frac{1}{8}$	78	...	...	33	4 $\frac{3}{4}$
G.E.80A	Split	Nose (Yoke)	40	2810	48	12 $\frac{1}{8}$	12 $\frac{9}{16}$	13 $\frac{3}{8}$	12 $\frac{15}{16}$	...	...	29 $\frac{13}{16}$	27 $\frac{3}{16}$	78	...	...	33	5
G.E.80B	Split	Nose (Yoke)	40	2890	48	12 $\frac{1}{8}$	12 $\frac{9}{16}$	13 $\frac{3}{8}$	12 $\frac{15}{16}$	...	...	27 $\frac{5}{16}$	27 $\frac{3}{16}$	78	...	...	33	5
G.E.57A	Split	Nose (Yoke)	50	2972	48	13	12 $\frac{3}{8}$	13 $\frac{7}{16}$	13 $\frac{1}{8}$	...	...	30 $\frac{1}{16}$	27 $\frac{9}{16}$	†80	84	...	34	4 $\frac{1}{2}$
G.E.57H	Split	Nose (Yoke)	50	3022	48	13	12 $\frac{9}{16}$	13 $\frac{7}{16}$	13 $\frac{1}{2}$	...	...	30 $\frac{3}{8}$	27 $\frac{7}{8}$	†80	84	...	34	5 $\frac{1}{4}$
G.E.90A	Split	Nose (Yoke)	50	2831	48	12 $\frac{1}{8}$	12 $\frac{9}{16}$	13 $\frac{3}{8}$	12 $\frac{15}{16}$	...	...	29 $\frac{13}{16}$	27 $\frac{3}{16}$	†80	84	...	33	5
G.E.90B	Split	Nose (Yoke)	50	2831	48	12 $\frac{1}{8}$	12 $\frac{9}{16}$	13 $\frac{3}{8}$	12 $\frac{15}{16}$	...	...	27 $\frac{5}{16}$	27 $\frac{3}{16}$	78	78	...	33	5
G.E.202A	Split	Nose (Yoke)	50	2604	48	11 $\frac{1}{2}$	12 $\frac{9}{16}$	12 $\frac{1}{4}$	12 $\frac{15}{16}$	...	...	28 $\frac{15}{16}$	27 $\frac{3}{16}$	78	†80	...	33	5
G.E.213A	Box	Nose	50	2600	48	10 $\frac{13}{16}$	12 $\frac{9}{16}$	13 $\frac{13}{16}$	13 $\frac{5}{8}$	30 $\frac{5}{8}$	26 $\frac{3}{16}$	26 $\frac{3}{16}$	...	78	78	...	33	5
G.E.87A	Split	Nose (Yoke)	60	3331	48	13	12 $\frac{5}{8}$	13	13	...	...	30 $\frac{3}{16}$	27 $\frac{5}{8}$	†80	84	...	34	5 $\frac{1}{2}$
G.E.87B	Split	Nose (Yoke)	60	3510	48	12 $\frac{3}{8}$	12 $\frac{5}{8}$	13 $\frac{5}{8}$	13	...	...	27 $\frac{7}{8}$	27 $\frac{3}{4}$	78	78	...	34	5 $\frac{1}{2}$
G.E.210A	Box	Nose (Yoke)	65	3278	48	11 $\frac{13}{16}$	12 $\frac{3}{8}$	13 $\frac{1}{16}$	13 $\frac{1}{8}$	...	28	27 $\frac{3}{16}$	26 $\frac{15}{16}$	78	78	78	33	4 $\frac{1}{2}$
G.E.73C	Box	Nose	75	4137	48	13	12 $\frac{15}{16}$	16 $\frac{1}{2}$	13 $\frac{1}{4}$	30 $\frac{1}{32}$	28 $\frac{5}{8}$	27 $\frac{7}{8}$	...	...	78	84	34	5 $\frac{1}{2}$
G.E.204A	Split	Nose (Yoke)	75	3364	48	11 $\frac{1}{2}$	12 $\frac{7}{8}$	13 $\frac{13}{16}$	13 $\frac{3}{16}$	...	...	30 $\frac{9}{16}$	28 $\frac{1}{8}$	...	84	84	34	6
G.E.205B	Box	Nose	100	3650	48	12 $\frac{3}{4}$	12 $\frac{1}{2}$	12 $\frac{7}{8}$	13 $\frac{3}{4}$	29 $\frac{13}{16}$	28 $\frac{1}{4}$	27 $\frac{9}{16}$	...	...	78	84	34	6
G.E.66C	Box	Nose	125	4375	50	13 $\frac{1}{4}$	13 $\frac{9}{16}$	17 $\frac{3}{16}$	14 $\frac{5}{8}$	30 $\frac{3}{8}$	29 $\frac{1}{4}$	28 $\frac{5}{8}$	...	...	78	84	35	6 $\frac{1}{2}$
G.E.55H	Box	Nose	160	5500	50	13 $\frac{5}{16}$	12 $\frac{13}{16}$	16 $\frac{1}{4}$	13 $\frac{1}{8}$	30 $\frac{3}{4}$	29 $\frac{3}{8}$	28 $\frac{5}{8}$	...	...	78	84	35	6 $\frac{1}{2}$
G.E.76B	Box	Nose	160	5166	50	13 $\frac{1}{8}$	13 $\frac{5}{8}$	15	14 $\frac{5}{8}$	32 $\frac{1}{4}$	30 $\frac{5}{8}$	29 $\frac{15}{16}$	...	...	84	84	35	6 $\frac{1}{2}$
G.E.69C	Box	Nose	200	6230	50	13 $\frac{1}{8}$	14 $\frac{3}{8}$	17 $\frac{1}{8}$	14 $\frac{1}{2}$	34 $\frac{3}{4}$	32 $\frac{5}{8}$	32 $\frac{1}{8}$	...	...	84	90	36	7 $\frac{1}{2}$

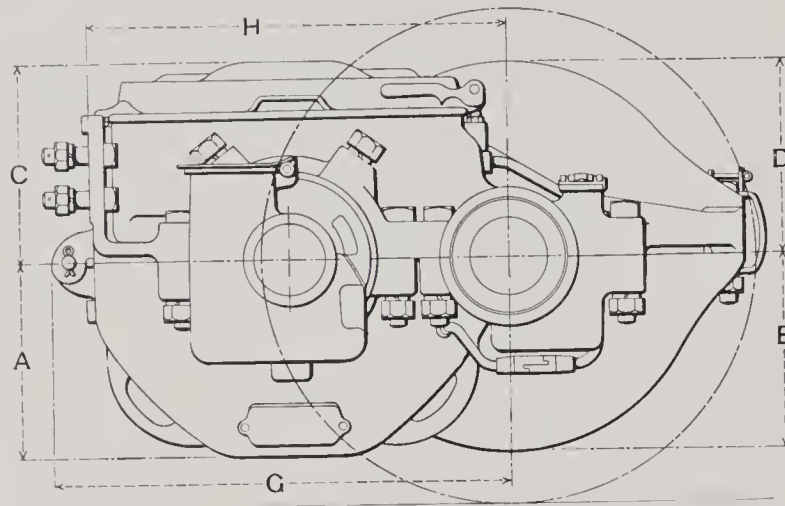
NOTE.—The dimensions given under "Wheel Base Required" refer to our standard types "A" and "B" trucks, having inside hung motors.

†This is a special wheel base. Our standard trucks would be built with 84-inch wheel base for these motors, unless a shorter wheel base were required.

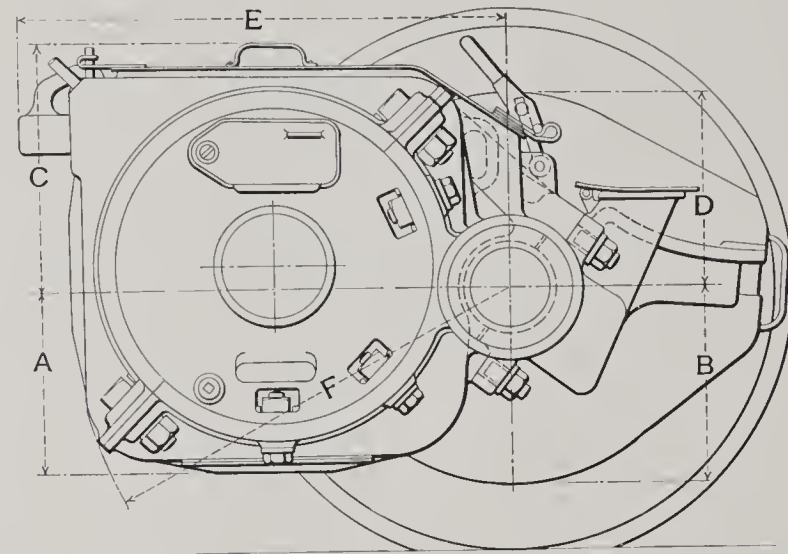
AMERICAN LOCOMOTIVE COMPANY

Types of Motor Suspension

WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY



Nose Bar Suspension



Nose Suspension

INDEX OF DIMENSIONS GIVEN IN TABLE ON OPPOSITE PAGE

Dimension	Description	Dimension	Description
A	Depth from center of axle to bottom of motor	E	Length from center of axle over nose (nose suspension)
B	Depth from center of axle to bottom of gear cover	F	Swinging clearance (nose suspension)
C	Height from center of axle to top of motor	G	Length from center of axle over motor (suspension end)
D	Height from center of axle to top of gear cover	H	Length from center of axle over face of suspension boss (nose bar suspension)

AMERICAN LOCOMOTIVE COMPANY

Principal Dimensions of Street Railway Motors

MANUFACTURED BY

WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY

No. of Motor	Type of Motor	Type of Suspension	Horse Power	Weight Pounds	Min. Space Taken on Axle Inches	DIMENSIONS INCHES								WHEEL BASE REQUIRED INCHES			Min. Diam. of Wheels Recom- mended Inches	Max. Diam. of Axle Inches
						A	B	C	D	E	F	G	H	8" Bolster Double Ell. Springs	10" Bolster Double Ell. Springs	12" Bolster Triple Ell. Springs		
92-A	Split	Nose (Bar)	35	2265	$42\frac{1}{16}$	$11\frac{7}{8}$	$12\frac{5}{16}$	$11\frac{7}{8}$	$12\frac{5}{16}$			$28\frac{13}{16}$	$26\frac{7}{8}$	78			33	5
101-B-2	Split	Nose (Bar)	40	2825	$39\frac{7}{16}$	$12\frac{3}{8}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$			29	$26\frac{3}{4}$	78	84		33	5
93-A-2	Split	Nose (Bar)	60	3440	$47\frac{31}{32}$	$13\frac{1}{8}$	$12\frac{7}{8}$	$13\frac{1}{8}$	$12\frac{7}{8}$			$30\frac{3}{8}$	$27\frac{7}{8}$	78	84		33	$5\frac{1}{2}$
112-B	Split	Nose (Bar)	75	3440	$47\frac{31}{32}$	$13\frac{1}{8}$	$13\frac{1}{16}$	$13\frac{1}{8}$	$13\frac{1}{16}$			$30\frac{11}{16}$	$28\frac{7}{32}$		84	84	33	$6\frac{1}{2}$
121-A	Split	Nose	90	4250	$47\frac{31}{32}$	$11\frac{1}{4}$	$12\frac{3}{4}$	$12\frac{5}{8}$	$12\frac{3}{4}$	31	$27\frac{15}{16}$				78	78	33	6
119	*Split	Nose	125	4680	$50\frac{3}{32}$	$11\frac{1}{2}$	$12\frac{3}{4}$	$16\frac{1}{8}$	$12\frac{3}{4}$	$31\frac{1}{8}$	$28\frac{1}{8}$				78	78	33	6
114	*Split	Nose	160	5270	$50\frac{11}{16}$	$12\frac{3}{16}$	$12\frac{3}{4}$	$15\frac{5}{16}$	$12\frac{3}{4}$	$32\frac{3}{16}$	29				78	84	33	6
113	*Split	Nose	200	6550	$50\frac{3}{32}$	$13\frac{1}{8}$	$13\frac{15}{16}$	$16\frac{3}{4}$	$13\frac{15}{16}$	$34\frac{1}{4}$	$31\frac{5}{8}$				84	84	34	$6\frac{1}{2}$
INTERPOLE MOTORS																		
307	Split	Nose (Bar)	50	2875	$40\frac{7}{16}$	$12\frac{3}{8}$	$12\frac{1}{2}$	$12\frac{5}{8}$	$12\frac{1}{2}$			$29\frac{7}{16}$	$26\frac{13}{16}$	78	84	84	33	5
306	Split	Nose (Bar)	65	2875	$40\frac{7}{16}$	$12\frac{3}{8}$	$12\frac{1}{2}$	$12\frac{5}{8}$	$12\frac{1}{2}$			$29\frac{7}{16}$	$26\frac{13}{16}$	78	84	84	33	5
305	Split	Nose (Bar)	75	3440	$47\frac{31}{32}$	13	$12\frac{7}{8}$	$13\frac{1}{2}$	$12\frac{7}{8}$			$30\frac{1}{2}$	$27\frac{7}{8}$	78	84	84	33	$5\frac{1}{2}$
304	Split	Nose (Bar)	90	3440	$47\frac{31}{32}$	13	$12\frac{7}{8}$	$13\frac{1}{2}$	$12\frac{7}{8}$			$30\frac{1}{2}$	$27\frac{7}{8}$	78	84	84	33	$5\frac{1}{2}$
301	Box	Nose	160	5515	$50\frac{3}{32}$	$12\frac{7}{8}$	$12\frac{7}{8}$	$16\frac{5}{8}$	$12\frac{7}{8}$	$32\frac{1}{16}$	29				78	84	34	$6\frac{1}{2}$
300	Box	Nose	200	6415	$50\frac{3}{32}$	$13\frac{1}{4}$	$13\frac{3}{4}$	17	$13\frac{3}{4}$	$34\frac{3}{16}$	$31\frac{5}{8}$				84	84	34	$6\frac{1}{2}$

NOTE.—The dimensions given under "Wheel Base Required" refer to our standard types "A" and "B" Trucks, having inside hung motors.

* Split on diagonal.

AMERICAN LOCOMOTIVE COMPANY

Data on Air-Brake Equipment

MANUFACTURED BY
GENERAL ELECTRIC COMPANY

DIMENSIONS AND DATA ON GENERAL ELECTRIC MOTOR DRIVEN AIR COMPRESSORS

Com- pressor Type	Size of Cylinder in Inches Diameter and Stroke	Revolutions per Minute	Capacity in Cu. Ft. Piston Displacement per Minute	Amperes at 550 Volts (Approx.)	SIZE OF PIPING IN INCHES		DIMENSIONS IN INCHES			Weight in Pounds
					Suction	Discharge	Length	Width	Height	
C P-21	5 $\frac{1}{4}$ x 3	200	15	4.7	1	$\frac{3}{4}$	26 $\frac{1}{8}$	25 $\frac{1}{4}$	15 $\frac{7}{8}$	550
C P-22	6 $\frac{11}{32}$ x 3 $\frac{1}{4}$	202	24	7.5	1 $\frac{1}{4}$	1	30 $\frac{1}{2}$	28 $\frac{1}{2}$	18 $\frac{3}{4}$	840
C P-23	7 $\frac{3}{4}$ x 5	183	50	16	1 $\frac{1}{2}$	1 $\frac{1}{4}$	37 $\frac{3}{8}$	34 $\frac{11}{16}$	23	1460

SIZES OF BRAKE CYLINDERS, AIR COMPRESSORS AND RESERVOIRS RECOMMENDED FOR CARS OF DIFFERENT WEIGHTS

Total Weight of Car (Without Load)	Diameter of Brake Cylinder	SIZE OF COMPRESSOR		NUMBER AND SIZE OF MAIN RESERVOIRS		Size of Auxiliary Reservoir (Automatic Brakes)
		Without Whistles	With Whistles	Without Whistles	With Whistles	
Pounds	Inches					
Up to 25,000	6	C P-21	C P-21	1—16"x 48"	1—16"x 48"	10"x 15"
25,000-40,000	8	C P-21	C P-21	1—16"x 48"	1—16"x 48"	10"x 24"
40,000-60,000	10	C P-21	C P-22	1—16"x 48"	2—16"x 48"	12"x 33"
60,000-85,000	12	C P-22	C P-22	2—16"x 48"	2—16"x 48"	14"x 33"
85,000-100,000	14	C P-22	C P-23	2—16"x 48"	2—16"x 72"	16"x 33"

Where trail cars are hauled, the total weight of motor and trail cars is to be used in determining the size of compressor and reservoirs.

Straight air brakes are recommended by the General Electric Company for cars always operating singly; emergency straight air brakes for cars operating singly and also in 2 or 3 car trains; combined straight and automatic air brakes for cars operating singly and in trains of *over* 3 cars.

AMERICAN LOCOMOTIVE COMPANY

Data on Air-Brake Equipment

MANUFACTURED BY

GENERAL ELECTRIC COMPANY

WEIGHTS OF GENERAL ELECTRIC AIR-BRAKE EQUIPMENTS (EXCLUSIVE OF PIPES AND FOUNDATION BRAKE GEAR)

TYPE OF EQUIPMENT	SIZE OF COMPRESSOR	WEIGHT OF EQUIPMENT COMPLETE POUNDS			
		DIAMETER OF BRAKE CYLINDER			
		6"	8"	10"	12"
Straight Air.....	C P-21	1055	1096	1140	1220
	C P-22	1395	1436	1480	1560
	C P-23	2218	2259	2303	2383
Emergency Straight Air...	C P-21	1135	1176	1220	1300
	C P-22	1475	1516	1560	1640
	C P-23	2298	2339	2383	2463
Automatic Air.....	C P-21	1349	1390	1434	1514
	C P-22	1689	1730	1774	1854
	C P-23	2512	2553	2597	2677
Combined Automatic and Straight Air.....	C P-21	1429	1470	1514	1594
	C P-22	1769	1810	1854	1934
	C P-23	2592	2633	2677	2757

The above weights of air-brake equipments are for motor car equipment only.

AMERICAN LOCOMOTIVE COMPANY

Data on Air-Brake Equipment

MANUFACTURED BY

WESTINGHOUSE TRACTION BRAKE COMPANY

DIMENSIONS AND DATA ON WESTINGHOUSE MOTOR-DRIVEN AIR COMPRESSORS

Com- pressor Type	Size of Cylinder in Inches Diam. x Stroke	Revolu- tions per Minute Pump Shaft	Capacity in Cu. Ft. Piston Displace- ment per Minute	Amperes at 600 Volts	SIZE OF PIPING IN INCHES		DIMENSIONS IN INCHES			Weight
					Suction	Discharge	Length	Width	Height	Pounds
D-1EG	5x3	214	14.57	4.4	1	$\frac{3}{4}$	24.75	23.44	17.81	648
D-2EG	$5\frac{1}{2} \times 4\frac{1}{4}$	217	25.31	7.9	$1\frac{1}{4}$	$\frac{3}{4}$	30.28	27.37	20.87	915
D-3EG	7x5	162	36	10.5	$1\frac{1}{2}$	1	33.12	28.78	22.25	1205
D-4EG	$7\frac{3}{4} \times 5$	183	50	16	$1\frac{1}{2}$	1	34.69	30.56	23.75	1347

WEIGHTS OF WESTINGHOUSE AIR-BRAKE EQUIPMENT (EXCLUSIVE OF PIPES AND FOUNDATION BRAKE GEAR)

Type of Equipment	Rated Capacity of Compressor	Diameter of Brake Cylinder	Weight of Equipment Complete
	Cu. Ft. per Minute	Inches	Pounds
Straight Air (Schedule SM)	14.5	8	1225
	25.31	10	2060
Automatic (Schedule AMM)	25.31	12	2190
	25.31	14	2330
	25.31	16	2550

Pipe and fittings for a 50 foot car will weigh approximately 350 pounds. Foundation air and hand brake gear (including supports) will weigh from 500 to 1200 pounds. The above weights of air-brake equipments are for motor car equipment only.

AMERICAN LOCOMOTIVE COMPANY

Data on Air-Brake Equipment

MANUFACTURED BY

NATIONAL BRAKE AND ELECTRIC COMPANY

DIMENSIONS, CAPACITIES AND OTHER DATA RELATING TO NATIONAL MOTOR-DRIVEN COMPRESSORS—DIRECT CURRENT

Compressor Number	Size of Cylinder in Inches	Revolutions per Minute	Capacity in Cubic Feet Free Air per Minute	H. P. at 90 Pounds Pressure	Amperes of Fuses at 550 Volts	SIZE OF PIPING IN INCHES		DIMENSIONS IN INCHES			Diameter of Brake Cylinder Used Inches	Weight Double End Equipment Complete Pounds
						Suction	Discharge	Length	Width	Height		
A-1	5x2½	193	11	2	6	1	¾	26¼	20¼	19⅛	8	1100
A-2	5x2½	193	11	2	6	1	¾	25	20⅜	17¾	8	1100
A-4	5x4	174	16	2.5	6	1	¾	26⅛	26⅜	22⅜	8 or 10	1300
BB-2	6½x3	172	20	4	10	1	¾	31⅝	23⅛	22½	10 or 12	1500
BB-4	6½x4¼	172	28	5.25	10	1	¾	31⅜	29⅜	24⅞	12 or 14	1650
CC-3	7½x4	172	35	7	15	1¼	1	35⅜	26⅜	25⅜	12 or 14	1750
DD-4	8½x4	186	50	10	20	1½	1	38⅜	26⅝	25½	12 or 14	2200

The above weights of air-brake equipments are for motor car equipment only and are exclusive of piping and foundation brake gear.

AMERICAN LOCOMOTIVE COMPANY

Data on Air-Brake Equipment

MANUFACTURED BY

NATIONAL BRAKE AND ELECTRIC COMPANY

EQUIPMENT RECOMMENDED FOR CARS OF DIFFERENT WEIGHTS AND FOR VARIOUS CLASSES OF SERVICE, UNDER NORMAL CONDITIONS

CLASS OF SERVICE	Weight of Car (Without Load) Pounds	Size of Compressor	Diameter of Brake Cylinder Inches	Number and Size of Reservoirs	Weight of Equipment Complete Pounds
Light City Service.....	40,000 to 50,000	A1, 11 cu. ft.	8	2—12"x 33" or 1—16"x 48"	1100
Heavy City and Suburban Service.....	50,000 to 70,000	A4 or BB2, 16-20 cu. ft.	10	1—16"x 60"	1300 to 1500
Interurban Service.....	70,000 to 120,000	BB2 or BB4, 20-28 cu. ft.	12 or 14	1—16"x 72"	1500 to 2200

The above weights of air-brake equipments are for motor car equipment only and are exclusive of piping and foundation brake gear.

AMERICAN LOCOMOTIVE COMPANY

DATA RELATIVE TO STANDARD CAR EQUIPMENT OF ELECTRIC RAILWAYS IN THE UNITED STATES AND CANADA

NAME OF RAILROAD	City	Class of Service	Type of Car	Gauge of Track	Maximum Speed Operated M. P. H.	Length of Body Over Bumpers	Length of Platform	Width of Body Over All	Height From Top of Rail Over All	Operated From One or Two Ends	Single or Double Trucks	Truck Wheel Base	Number of Motors	H.P. of Each Motor	Diameter of Wheels	Type of Wheel	Width of Tread
ARKANSAS																	
Ft. Smith Light & Trac. Co.	Ft. Smith	City	Closed	4' 8½"	20	37' 9"	6' 0"	8' 4"	12' 0"	Two	D'ble	54"	2	50	33"	C. I.	3"
CALIFORNIA																	
United R.R'ds. of S. Francisco	San Francisco	City	Closed	4' 8½"	8	45' 4"	6' 0"	9' 3"	12' 0"	Two	D'ble	52"	4	50	33"	C. I.	2¼"
Oakland Traction Co.	Oakland	Inter'b'n		4' 8½"	32	50' 0"		9' 0"	12' 0"	Two	D'ble	66"	4	40	34"	S. T.	3"
Sacramento Elec. Gas & Ry. Co.	Sacramento	City	½ Closed	4' 8½"	8	40' 8"	9' 6"	9' 6"	11' 9½"	Two	D'ble	48"	2	25	30"	C. I.	2¼"
COLORADO																	
Denver City Tramway Co.	Denver	City	Side Entrance	3' 6"	10	43' 3½"	4' 2½" F	8' 7"	11' 8"	One	D'ble	57"	4	43	33"	C. I.	3"
Denver City Tramway Co.	Denver	City	Side Entrance	3' 6"	10	40' 3½"	4' 2½" F	8' 9"	11' 8"	One	D'ble	58"	2	50	33"	C. I.	3"
Denver City Tramway Co.	Denver	City	*Side Entrance	3' 6"	10	38' 1"		8' 2"	10' 4½"		D'ble	48"			30"	C. I.	2½"
Denver & Interurban R. R. Co.	Denver	Inter'b'n	Closed	4' 8½"	60	55' 6"	3' 6"	10' 0"	14' 0"	One	D'ble	90"	4	125	38"	R. S.	4½"
CONNECTICUT																	
Connecticut Co.	New Haven	Inter'b'n	Closed	4' 8½"	45	44' 1½"	4' 2¾"	8' 4½"	11' 8½"	Two	D'ble	76"	4	60	34"	R. S.	4½"
Connecticut Co.	New Haven	Inter'b'n	Open	4' 8½"	30	42' 0"	3' 11¼"	8' 3¾"	11' 8½"	Two	D'ble	54"	2	60	34"	S. T.	3"
Connecticut Co.	New Haven	Inter'b'n	Open	4' 8½"	30	42' 0"	3' 11¼"	8' 3¾"	11' 8½"	Two	D'ble	54"	4	40	34"	S. T.	3"
DISTRICT OF COLUMBIA																	
Capital Traction Co.	Washington	City	Semi-Conv.	4' 8½"	15	39' 6"	4' 6"	8' 2"	12' 0"	Two	D'ble	54"	2	40	30"	C. I.	1½"
Capital Traction Co.	Washington	City	Closed	4' 8½"	15	26' 0"	3' 6"	7' 8"	10' 9½"	Two	Single	72"	2	35	30"	C. I.	1½"
ILLINOIS																	
Chicago City Ry. Co.	Chicago	City	Pay as you Enter	4' 8½"	25	48' 3"	7' 5"	9' 0"	11' 10"	Two	D'ble	54"	4	40	34"	R. S.	2¼"
Metropolitan W. Side El. Ry. Co.	Chicago	Elevated	Box	4' 8½"	35	47' 7¾"		8' 9"	12' 10"	Two	D'ble	78"†	2	160	34½"†	S. T.	4¼"
East St. Louis & Sub. Ry. Co.	E. St. Louis	City	Box	4' 8½"		41' 0"	4' 0"	8' 8"	12' 6"		D'ble	66"†	2	40	31¼"†	C. I.	
Aurora, Elgin & Chicago	Wheaton	Inter'b'n	Closed	4' 8½"	70	47' 2¾"	4' 1"	8' 10"	13' 2½"	Two	D'ble	54"	4	125	37"	S. T.	4½"
INDIANA																	
Indiana Union Traction Co.	Anderson	Inter'b'n	Closed	4' 8½"	60	53' 6"	4' 11"	9' 1½"	13' 9"	One	D'ble	78"	4	75	37¼"	R. S.	3"
Terre Haute, Indianapolis & Eastern Traction Co.	Indianapolis	Inter'b'n	Closed	4' 8½"	60	61' 6"	6' 0"	9' 0"	13' 1"	One	D'ble	78"	4	85	37¼"	S. T.	3"
Ft. Wayne & Wabash V. Trac. Co.	Ft. Wayne	City	Closed	4' 8½"	12	32' 6"	4' 6"	7' 10"	11' 7"	Two	Single	84"	2	35	33"	C. I.	27½"
IOWA																	
Ft. Dodge, Des Moines & So'ern R. R.	Boone	Inter'b'n	Closed	4' 8½"	40	53' 3½"	4' 5½"	9' 10"	13' 1¼"	One	D'ble	78"	4	75	36"	S. T.	4"
MARYLAND																	
United Rys. & Electric Co.	Baltimore	City	Semi-Conv.	5' 4½"	22	42' 4"	5' 0"	8' 4½"	12' 5½"	Two	D'ble	54"	4	40	33"	C. I.	2½"
Washington, Baltimore & Annapolis El. Ry. Co.	Baltimore	Inter'b'n	Closed	4' 8½"	45	62' 0"	4' 9"	9' 3"	13' 0"	Two	D'ble	90"	4	125	37½"	S. T.	4¼"

NOTE.—In the column "Type of Wheel," C. I.=cast iron chilled; S. T.=steel tired; R. S.=rolled steel. *Trailer car. †Motor truck. ‡Trailer truck. §California type.

AMERICAN LOCOMOTIVE COMPANY

TABLE 1. RELATIVE TO STANDARD CAR EQUIPMENT OF ELECTRIC RAILWAYS IN THE UNITED STATES AND CANADA

AMERICAN LOCOMOTIVE COMPANY

DATA RELATIVE TO STANDARD CAP EQUIPMENT OF ELECTRIC SUPPLY IN THE UNITED STATES AND CANADA

AMERICAN LOCOMOTIVE COMPANY

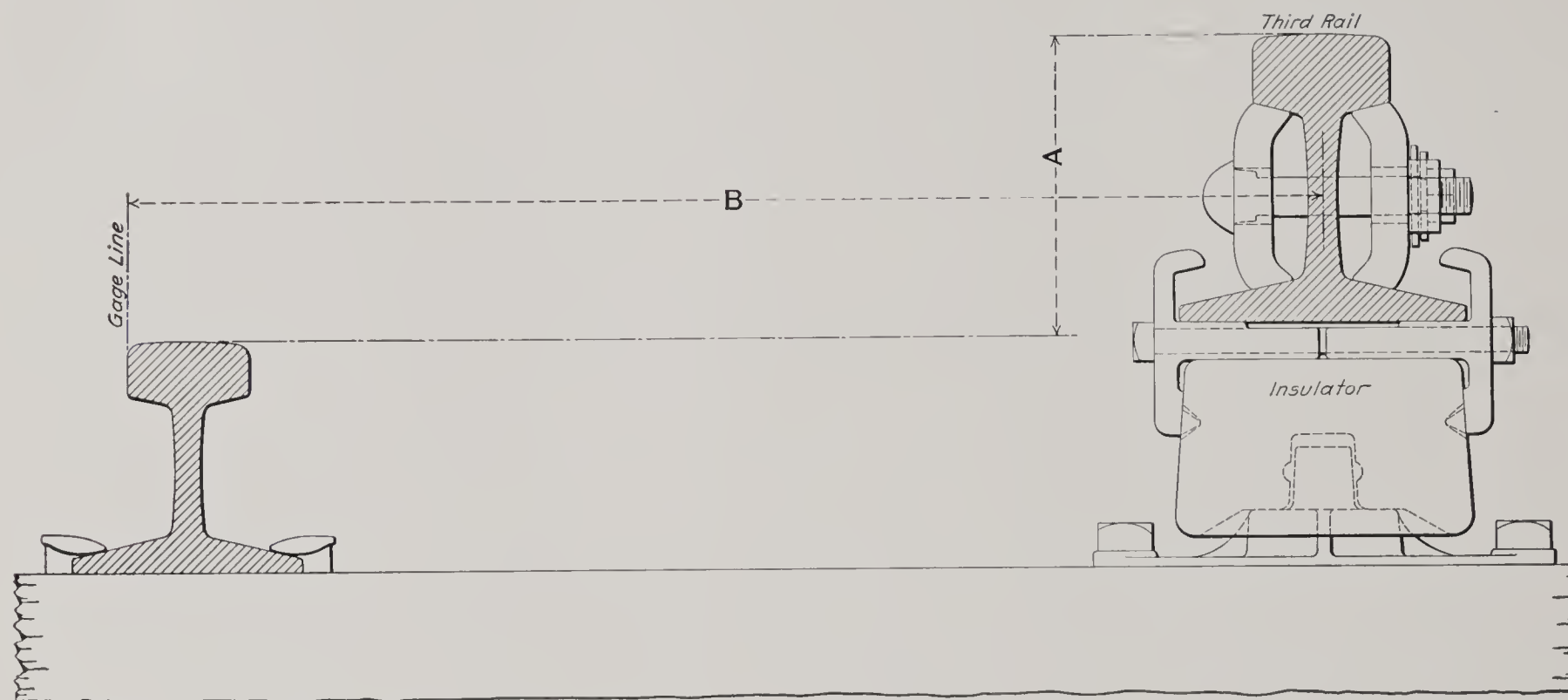


DIAGRAM OF LOCATION OF THIRD RAIL

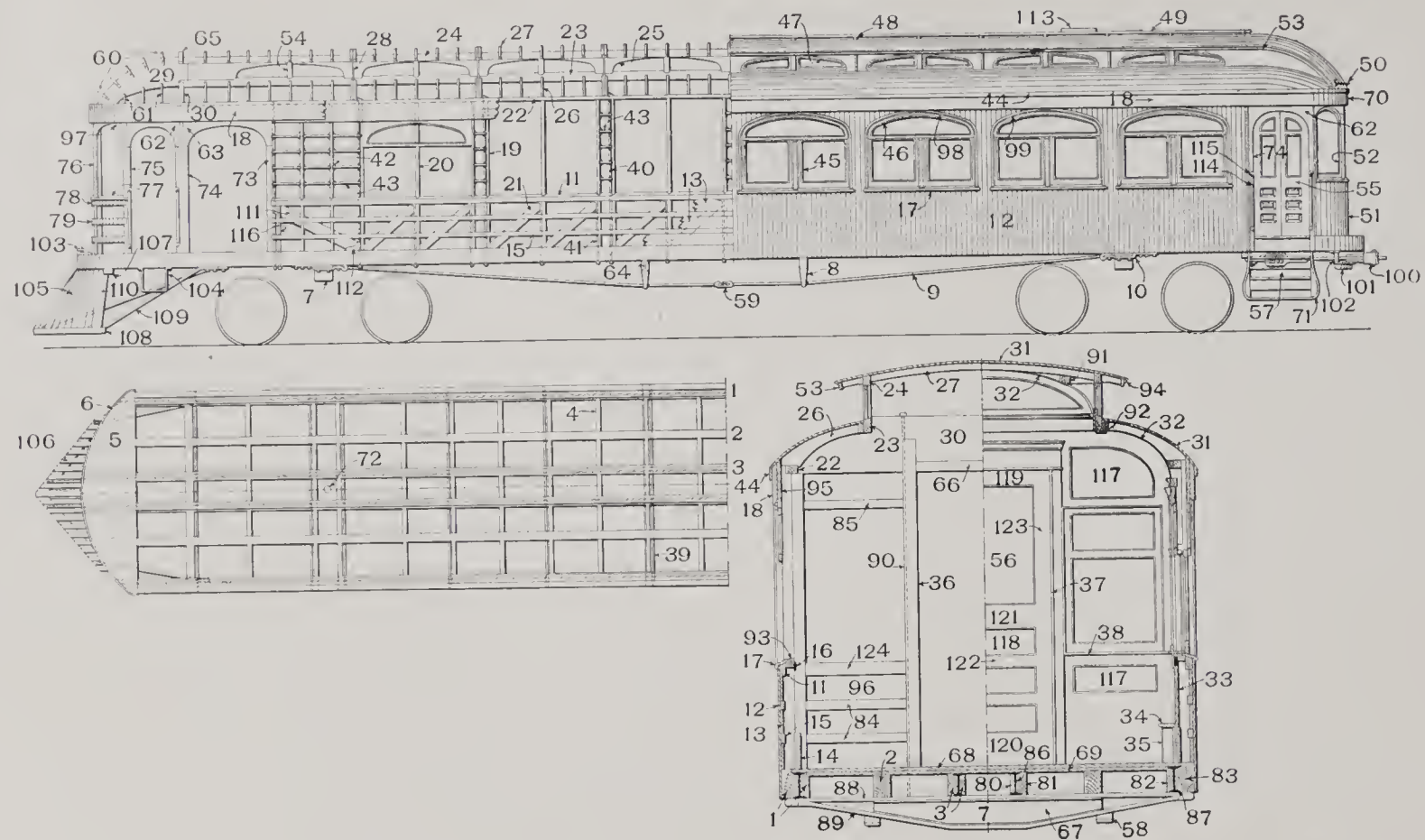
(See Table on Opposite Page)

AMERICAN LOCOMOTIVE COMPANY

LOCATION OF THIRD RAIL ON RAILWAYS USING THAT SYSTEM OF TRANSMISSION

NAME OF RAILWAY	A Distance from Top of Positive Rail to Top of Track Rail Inches	B Distance from Track Gauge Line to Center of Positive Rail Inches	NAME OF RAILWAY	A Distance from Top of Positive Rail to Top of Track Rail Inches	B Distance from Track Gauge Line to Center of Positive Rail Inches
MAIN LINE ROADS (ELECTRIC AND STEAM SERVICE)			ELEVATED AND UNDERGROUND ROADS		
Baltimore & Ohio R. R., Baltimore, Md...	31½	30	Mersey Ry., Liverpool, Eng.....	4½	22
Milan-Gallarate Ry., Milan, Italy.....	7½	26⅝	Metropolitan West Side Elevated Ry., Chi- cago, Ill.....	6¼	20⅛
New York Central & Hudson River R. R., New York, N. Y.....	2¾	28¼	North Western Elevated R. R., Chicago, Ill.	6½	20⅛
Oneida Ry., Oneida, N. Y.....	2¾	32	North Eastern Ry., Newcastle, Eng.....	7⅞	19¼
Paris-Orleans Ry., Paris, France.....	7⅞	25⅝	Paris-Versailles Ry., Paris, France.....	6¾	25⅝
			South Side Elevated R. R., Chicago, Ill....	12⅝	20⅛
			Wannsebahn R. R., Berlin, Germany.....		33½
ELEVATED AND UNDERGROUND ROADS			INTERURBAN ROADS (ELECTRIC SERVICE ONLY)		
Berlin Elevated Ry. (Elevated Portion), Ber- lin, Germany.....	7		Albany & Hudson R. R., Hudson, N. Y...	6	27
Berlin Elevated Ry. (Underground Portion), Berlin, Germany.....	9		Aurora, Elgin & Chicago Ry., Chicago, Ill.	6⅝	20⅛
Boston Elevated Ry., Boston, Mass.....	6	20⅝	Grand Rapids, Grand Haven & Muskegon Ry., Grand Rapids, Mich.....	5¾	20⅝
Brooklyn Rapid Transit Co. (Elevated), Brooklyn, N. Y.....	6	21¾	Lackawanna & Wyoming Valley R. R., Scranton, Pa.....	6	20⅝
Central London R. R., London, Eng.....	1½	Cen. of Track	North Western Pacific R. R., S. Francisco, Cal.....	6	27
Fayet-Chamoix Ry., Fayet, France.....	9	23	Scioto Valley Traction Co., Columbus, O...	6	28
Interborough Rapid Transit Co. (Subway), New York, N. Y.....	4	26	Puget Sound Elec. Ry., Tacoma, Wash....	7½	20
Interborough Rapid Transit Co. (Elevated), New York, N. Y.....	7½	20¾	West Jersey & Sea Shore R. R., Camden, N. J.....	3½	27½
Liverpool Overhead R. R., Liverpool, Eng..	1½	Cen. of Track	Wilkes-Barre & Hazleton R. R., Hazleton, Pa.....	5	28
Lake Street Elevated R. R., Chicago, Ill...	6½	20⅛			
Long Island R. R., Long Island City, N. Y..	3½	27½			

AMERICAN LOCOMOTIVE COMPANY



THE JEWETT CAR COMPANY'S STANDARD CONSTRUCTION

INTERURBAN COMBINATION PASSENGER AND BAGGAGE CAR

AMERICAN LOCOMOTIVE COMPANY

The Jewett Car Company's Standard Construction

INTERURBAN COMBINATION PASSENGER AND BAGGAGE CAR

Name of Part	Name of Part	Name of Part
1. Side sill	22. Side plate	43. Stay girths
2. Intermediate sill	23. Deck sill	44. Lower deck eaves moulding
3. Center sill	24. Deck plate	45. Lower sash
4. Floor joist	25. Deck pier post	46. Gothic sash
5. Buffer timber	26. Lower deck carline	47. Deck sash
6. Buffer band	27. Upper deck carline	48. Trolley carline
7. Bolster	28. Steel carline	49. Trolley plank
8. Queen post	29. Hood extension	50. Trolley rope guard
9. Under truss rod	30. End plate	51. Dash
10. Truss rod anchor	31. Roof boards	52. Vestibule sash
11. Belt rail	32. Headlining	53. Upper deck eaves rail
12. Sheathing	33. Wainscoting	54. Intermediate deck post
13. Filling panels	34. Truss plank capping	55. Vestibule door
14. Truss plank	35. Heater pipe shields	56. End door
15. Side rib	36. End posts	57. Step
16. Over truss rod	37. End door casing	58. Body side bearing
17. Sash stool	38. End panel capping	59. Turnbuckle
18. Letter board	39. Bottom frame tie rods	60. Hood upper carlines
19. Pier post	40. Body tie rod	61. Hood lower carlines
20. Intermediate post	41. Window brace rods	62. Vestibule door header
21. Window brace	42. Glue blocks	63. Baggage door header

AMERICAN LOCOMOTIVE COMPANY

The Jewett Car Company's Standard Construction

INTERURBAN COMBINATION PASSENGER AND BAGGAGE CAR

Name of Part	Name of Part	Name of Part
64. Needle beam	85. End window header	105. Pilot
65. End deck transom carline	86. Center sill I-beam	106. Pilot knee
66. End door header	87. Side sill I-beam	107. Pilot top rail
67. Bolster filler	88. Bolster top plate	108. Pilot bottom frame
68. Top floor	89. Bolster bottom plate	109. Pilot brace
69. Bottom floor	90. End door post tie rod	110. Pilot corner post
70. Vestibule letter board	91. Upper deck furring	111. Corner brace
71. Step hanger	92. Deck sill furring	112. Corner brace pocket
72. King bolt hole	93. Sash stool furring	113. Trolley base
73. Baggage door post	94. Canvas moulding	114. Body grab handles
74. Corner post	95. Inside letter board	115. Body grab handle socket
75. Vestibule corner post	96. End filling panel	116. Corner brace rod
76. Intermediate vestibule post	97. Vestibule window lintel	117. End part panel
77. Vestibule sash stool	98. Side window lintel	118. Door panel
78. Vestibule belt rail	99. Side window batten	119. Top rail of door
79. Vestibule dash rib	100. Draw bar	120. Bottom rail of door
80. Inside filler of center sill	101. Draw bar carrier	121. Center rail of door
81. Outside filler of center sill	102. Draw bar column	122. Door mullions
82. Inside filler of side sill	103. Draw bar pocket	123. Door stile
83. Outside filler of side sill	104. Stirrup step	124. End belt rail
84. End rib		

AMERICAN LOCOMOTIVE COMPANY

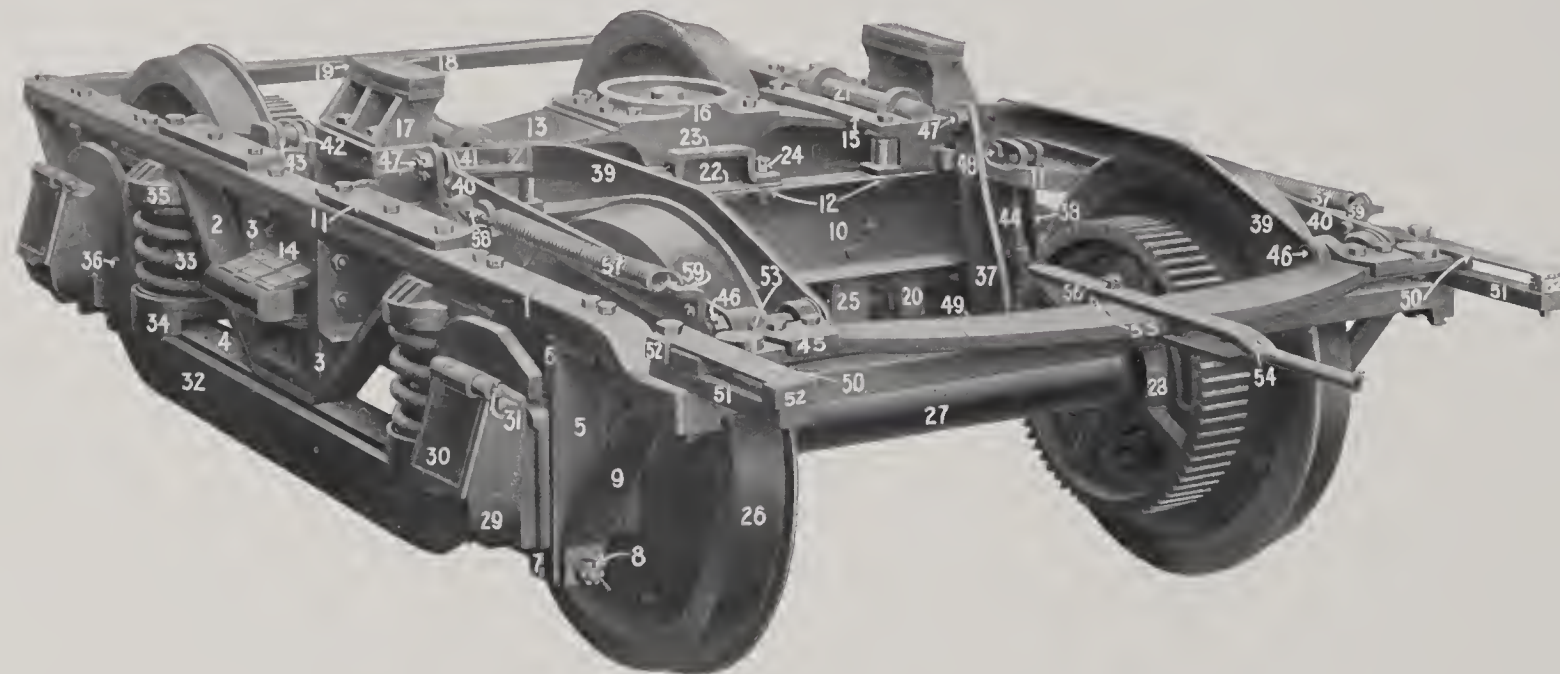
Dimensions and Weights of Car Bodies

MANUFACTURED BY

THE CINCINNATI CAR COMPANY

TYPE OF CAR	Length Over All	Length Over Body Corner Posts	Width Over Outside of Side Sills	Height from Bottom of Side Sill Over All	Wood or Steel Underframing	Wood or Steel Side Panels	Vestibuled One or Two Ends	Approximate Weight of Body Alone
	Feet and Inches	Feet and Inches	Feet and Inches	Feet and Inches				Pounds
3-Compartment Interurban	61-6	—	8-7 $\frac{3}{4}$	9-6	Wood and Steel	Wood Sheathing	Two	40,900
3-Compartment Interurban	55-0	—	8-5 $\frac{1}{4}$	9-6	Wood and Steel	Wood Sheathing	Two	32,000
Straight Interurban	52-7 $\frac{1}{2}$	40-0 $\frac{1}{2}$	8-8 $\frac{3}{4}$	9-6 $\frac{3}{4}$	Wood and Steel	Wood Sheathing	One	27,850
2-Compartment Interurban	50-6	40-0	8-1	9-6	Wood and Steel	Wood Sheathing	Two	34,800
Closed Suburban	46-4	36-2	8-2 $\frac{1}{2}$	9-7	Wood and Steel	Wood Panels	One	23,500
Closed City	44-6	33-0	8-0	9-6	Wood and Steel	Wood Sheathing	Two	21,000
Closed City	42-8	30-8	8-4 $\frac{1}{2}$	8-6	Wood	Steel	One	17,000
Semi-Convertible City	39-6	28-0	7-10 $\frac{1}{2}$	9-0	Wood	Wood and Steel	Two	18,000
Closed City	39-0	28-0	7-10 $\frac{1}{2}$	8-11 $\frac{1}{2}$	Wood	Steel Panels	One	15,000
Closed City	35-7	25-6	7-6 $\frac{3}{8}$	8-11 $\frac{1}{4}$	Wood	Wood Panels	Two	15,500
Closed Single Truck	34-9	23-0	8-1	9-2 $\frac{1}{4}$	Wood	Wood Panels	One	12,200
Semi-Convertible Single Truck	31-1	20-8	8-2 $\frac{1}{2}$	9-0	Wood	Steel Panels	Two	11,500
Closed Single Truck	28-0	18-0	7-10	9-0	Wood	Steel Panels	Two	10,500
15-Bench Open	41-9	33-2 $\frac{3}{4}$	7-3	8-11 $\frac{1}{2}$	Wood	M. I. Panels	—	15,000
13-Bench Open	37-9	29-0 $\frac{3}{4}$	7-3	8-11 $\frac{1}{2}$	Wood	M. I. Panels	—	14,000
10-Bench Open Single Truck	29-9	20-11 $\frac{1}{4}$	6-9 $\frac{1}{4}$	9-2 $\frac{1}{4}$	Wood	M. I. Panels	—	10,000
Baggage Car	55-0	50-6	8-8	9-4	Wood and Steel	Wood Sheathing	Two	33,200
Baggage Car	50-0	—	8-4 $\frac{1}{2}$	9-4	Wood and Steel	Wood Sheathing	Two	29,400

AMERICAN LOCOMOTIVE COMPANY



STANDARD TYPE "A" HIGH SPEED TRUCK

WITH CAST STEEL BOLSTER

AMERICAN LOCOMOTIVE COMPANY

Parts of Standard Type "A" High Speed Truck

(With Solid Cast Steel Bolster)

Name of Part

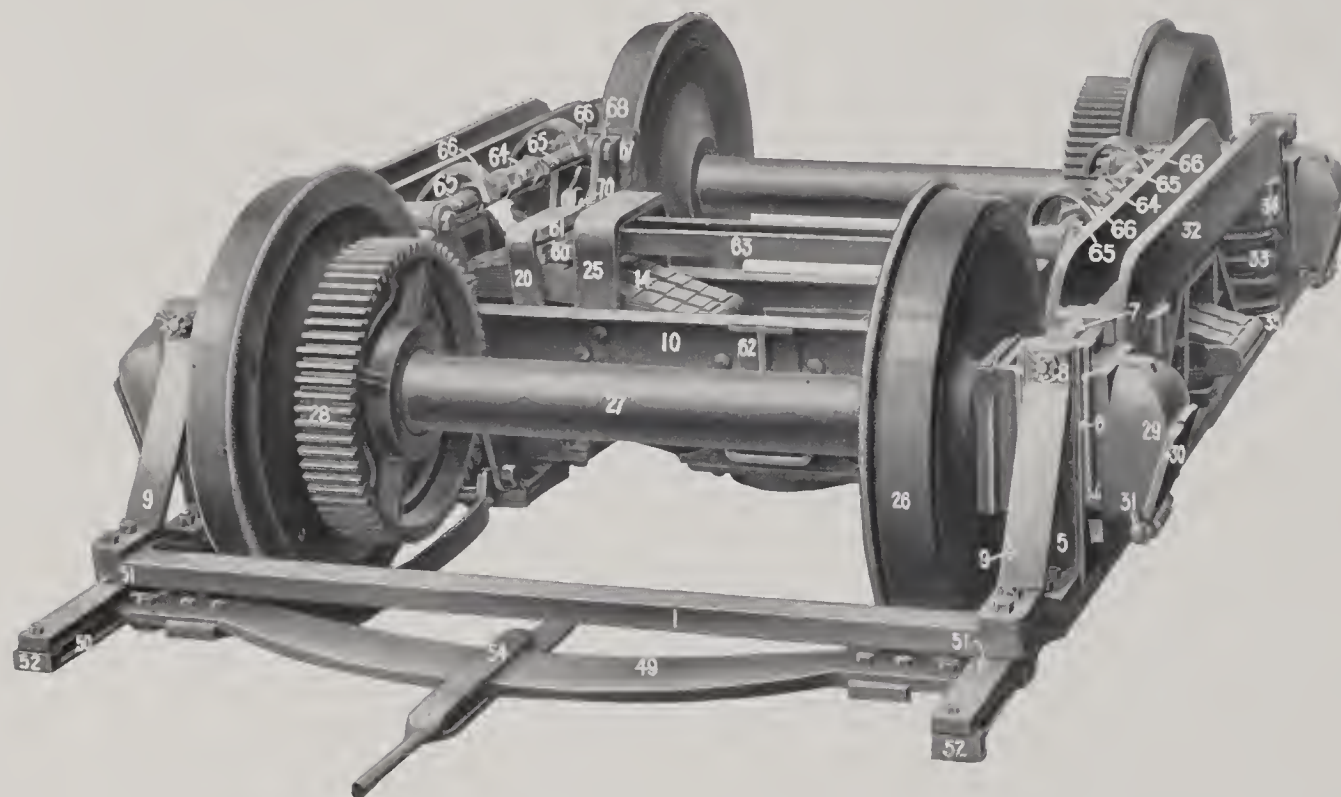
Name of Part

1. Top frame
2. Frame truss
3. Frame center
4. Frame bottom tie
5. Frame pedestal
6. Frame pedestal wear shoe
7. Frame pedestal filler
8. Frame pedestal bolt and nut
9. Frame pedestal brace
10. Transom
11. Transom gusset, right and left (front and back)
12. Transom channel washers
13. Bolster
14. Bolster spring
15. Bolster safety strap
16. Truck center plate
17. Side bearing
18. Side bearing wear plate
19. Side bearing shims
20. Swing link
21. Swing link pin
22. Motor nose wear piece
23. Motor nose strap
24. Motor nose strap bolt and nut
25. Spring plank safety strap
26. Wheel
27. Axle
28. Gear
29. Journal box
30. Journal box lid
31. Journal box lid bolt

} For other parts of box see page 108

32. Equalizer
33. Equalizer spring
34. Equalizer spring seat
35. Equalizer spring cap
36. Equalizer separator bolt
37. Brake live lever, right and left (inside)
38. Brake live lever, right and left (outside)
39. Brake live lever rod, right and left (inside)
40. Brake live lever rod, right and left (outside)
41. Brake live lever rod filler (right and left)
42. Brake dead lever, right and left (inside)
43. Brake dead lever, right and left (outside)
44. Brake hanger, right and left
45. Brake rod connection
46. Brake rod connection bolt and nut
47. Brake rod filler bolt and nut
48. Brake hanger pin and nut
49. Brake lever equalizer
50. Brake lever equalizer guide (top)
51. Brake lever equalizer guide (bottom)
52. Brake lever equalizer guide (fillers)
53. Brake lever equalizer roller
54. Brake pull rod jaw
55. Brake pull rod roller
56. Brake pull rod roller bolt and nut
57. Brake release spring
58. Brake release spring hook
59. Brake release spring bracket

AMERICAN LOCOMOTIVE COMPANY



BOTTOM VIEW OF STANDARD TYPE "A" HIGH SPEED TRUCK
(With Cast Steel Bolster)

Name of Part

- 60. Bolster spring seat
- 61. Swing link rocker
- 62. Motor nose support
- 63. Spring plank

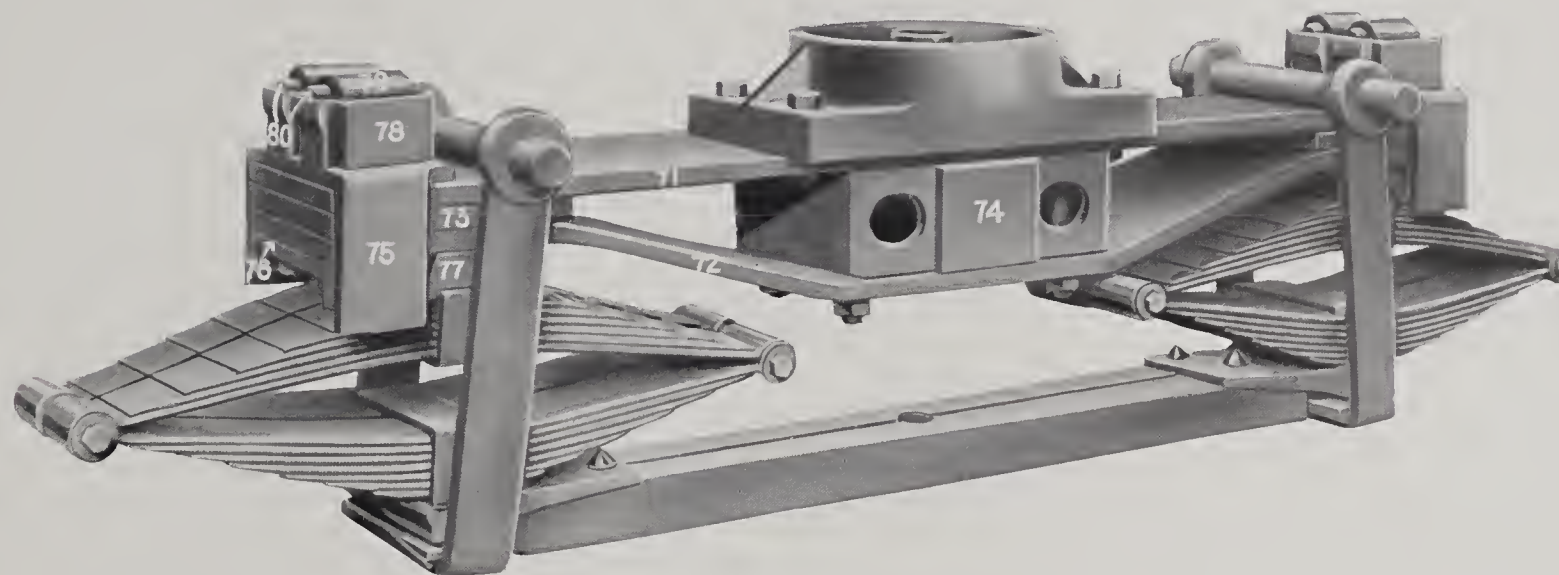
Name of Part

- 64. Brake turnbuckle
- 65. Brake turnbuckle ends
- 66. Brake turnbuckle safety strap
- 67. Brake shoe

Name of Part

- 68. Brake shoe key
- 69. Brake head
- 70. Brake head bolt and nut

AMERICAN LOCOMOTIVE COMPANY



BUILT-UP BOLSTER AND ROLLER SIDE BEARINGS

Name of Part	Name of Part	Name of Part
71. Bolster top bar	75. Bolster wear piece	78. Side bearings
72. Bolster bottom bar	76. Bolster wear piece filler	79. Side bearing rollers
73. Bolster filler (end)	77. Bolster spring cap	80. Side bearing roller pins
74. Bolster filler (center)		

AMERICAN LOCOMOTIVE COMPANY



DETAILS OF JOURNAL BOX AND CAR BODY CENTER PLATE

Name of Part

- 81. Car body center plate
- 82. Journal bearing

Name of Part

- 83. Journal bearing wedge
- 84. Journal bearing dust-guard

Directions for Ordering Repair Parts

Each of our trucks bears the name plate of the company, riveted to the Frame or Equalizer (on one side of the truck) on which is given the serial building number of the truck, also the year and month in which it was built. In ordering repair parts, give the name of the part required and the serial building number of the truck. This information will enable us to readily locate the truck in our records which contain all the data necessary to furnish duplicate parts.

When ordering castings, instead of the name, the pattern number which will be found cast on each piece may be given.

If the name plate is missing, give the name of the company under which the order for the truck was placed and the approximate date of the order.

Important. In cases where it is necessary to specify whether the part required is for the right or left hand side of the truck, consider the brake connection end of the truck as the back or rear end and look forward towards the front end in determining which is the right and left hand.

Material Specifications

Wrought Iron. The material must be free from steel scrap and all bars must be practically smooth, free from cinderspots, blisters, cracks, slivers or injurious flaws. Round iron must conform to the limit gauges adopted by the American Railway Master Mechanics' Association, and rectangular iron must not vary more than .03 inch from size ordered. All bars must bend around same thickness or diameter as test piece either hot or cold. Bars must show a generally fibrous fracture free from steel or crystalline spots and not over 15 per cent. of the fractured surface shall be granular.

Rectangular bars must have a tensile strength of not less than 48,000 pounds per square inch and an elongation in 8 inches not less than 20 per cent.

Round bars must have a tensile strength not less than 50,000 pounds and an elongation in 8 inches not less than 25 per cent. All bars must have an elastic limit not less than 25,000 pounds.

Steel Forgings (For Axles). All steel forgings must conform to the specifications adopted by the American Railway Master Mechanics' Association and the American Society for Testing Material and must be made of steel manufactured by the open hearth process. Forgings must be free from seams, pipes, and other defects. Specimens for testing must be taken from a point half way between the center and outside of the forgings and parallel to its axis.

The test specimens must have a tensile strength

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not less than 80,000 pounds and an elongation in 2 inches not less than 18 per cent. Drillings or turnings from the test specimens must show on analysis the following composition:

Phosphorus . . .	not over 0.05 per cent.
Sulphur . . .	not over 0.05 per cent.
Manganese . . .	not over 0.60 per cent.

Forgings failing to meet the above specifications or which prove defective on machining will be rejected.

Spring Steel. All bars must be of steel manufactured by the crucible or open hearth process. Bars must not vary more than .01 inch in thickness and .02 inch in width from ordered sizes and must have square ends and be free from seams, hollow spots, cracks on edges, or laminations. Drillings for analysis shall be taken by removing the scale by grinding and drilling the bar in the center; and at

least 2 oz. of drillings shall be analyzed from every 100 bars or less of each size.

An analysis must show the following composition:

Carbon . . .	.0.90 to 1.10 per cent.
Manganese . . .	.0.25 to 0.50 per cent.
Silicon . . .	.0.15 to 0.25 per cent.
Phosphorus . .	not more than 0.05 per cent.
Sulphur . . .	not more than 0.05 per cent.
Copper . . .	not more than 0.05 per cent.

Elliptic and Semi-Elliptic Springs must be made of steel manufactured by the crucible or open hearth process. The plates must be free from any defects and must not vary more than .03" in width nor more than .02" in thickness from the ordered sizes, and the bands must not vary more than $\frac{1}{4}$ inch in length, $\frac{1}{16}$ inch in width or $\frac{1}{32}$ inch in thickness. Springs in which the distance center to center varies more than $\frac{1}{4}$ inch from card will be rejected.

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At least 25 per cent. of each lot of springs must be tested under one and one-half the specified load, the ends of the semi-elliptic springs being supported on swinging or rolling bearings. When released from one and one-half the specified load, the springs must not be higher nor more than $\frac{3}{8}$ inch lower than specified heights and must not take a permanent set when free. All springs must deflect uniformly under test loads.

The steel must show on analysis the following composition:

Carbon		.0.90 to 1.10 per cent.
Manganese		.0.25 to 0.50 per cent.
Silicon		.0.15 to 0.25 per cent.
Phosphorus		not over 0.05 per cent.
Sulphur		not over 0.05 per cent.

Soft Steel. All soft steel for universal plates and structural steel shapes must be manufactured by the

open hearth process and must conform to the specifications adopted by the American Society for Testing Materials. The material must be free from injurious seams, flaws or cracks and must have the following composition:

Phosphorus		not over 0.06 per cent.
Sulphur		not over 0.06 per cent.

Two tensile tests must be taken of each melt, one from the lightest and one from the heaviest gauge into which the melt is rolled.

The tests must show a tensile strength not less than 52,000 or more than 62,000 pounds per square inch, an elastic limit not less than one-half the tensile strength and an elongation of not less than 25 per cent. in 8 inches.

For each increase of one-eighth in thickness above $\frac{3}{4}$ inch, a reduction of 1 per cent. shall be made from specified elongation. Test pieces must bend

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180° flat without fracture on outside of the bent portion, either hot, cold or cherry red.

Steel Castings. All steel castings must be made of material manufactured by the open hearth process and must conform to the specifications adopted by the American Society for Testing Materials. The castings must be free from slag, blowholes, shrinkage cracks and sand.

Test specimens 1 inch square and 10 inches long must show a tensile strength not less than 60,000 pounds per square inch, an elastic limit not less than 27,000 pounds per square inch, an elongation of not less than 22 per cent. in 2 inches and a reduction in area not less than 30 per cent.

A chemical analysis must meet the following specifications:

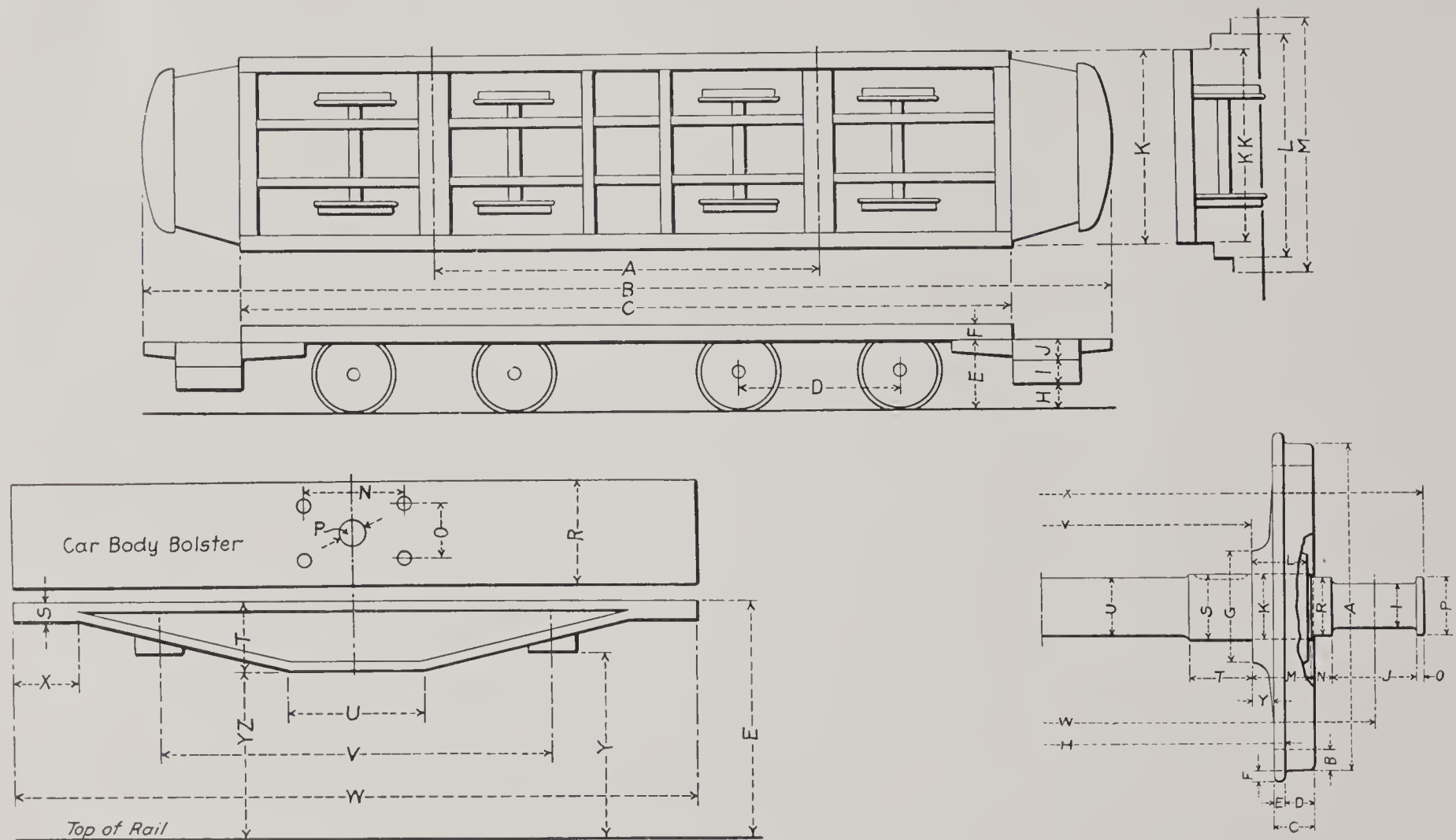
Phosphorus	. . . not over 0.05 per cent.
Sulphur	. . . not over 0.05 per cent.

Castings which are annealed must be heated uniformly to about 850° centigrade or 1560° Fahrenheit, the heat being applied slowly enough so that castings in all parts of the furnace are of approximately the same temperature.

Bearing Metal. Truck bearings must be of the following composition:

Copper	 75 per cent.
Tin	 not less than 6 per cent.
Lead	 not more than 20 per cent.
Impurities (including Zinc)	not over 3 per cent.

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Illustrating how to Measure Dimensions asked for in "Memorandum for Specification."

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Memorandum for Specification

GENERAL

Number of trucks
Delivery wanted
Point of delivery
Motor.....Trailer.....
Type of truck
Class of service
Maximum operating speed
Installation, trolley or third rail
Style of rail
Radius of shortest curve

WEIGHTS

Weight of car body only
Weight of car body electrical equipment
Weight of car body air-brake equipment
Approximate weight of each truck (without motors)
Maximum passenger or freight load
Maximum load on each center plate

DETAILS

Wheels furnished by
Wheels applied by
Wheels, type..... Make
Wheels, material of center
Wheels, spoke, single or double plate
Style of tire fastening
Wheels keyed on axle?
Weight of each wheel
Type of center plate
Type of side bearing
Type of journal box

MOTORS

Type..... Make
Number of motors on each truck
Motor suspension, rigid or on springs
Motors, inside or outside hung
Horse power of each motor

Requests for propositions should give as much of the above data as possible. (See also following sheet).

11

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Memorandum for Specification

MOTORS—Continued

Motors applied by.....
Gears, solid or split.....
Gears keyed on axle?.....
Gears furnished by.....
Gears applied by.....

WHEEL DATA

Diameter "A"..... Width of tread "D".....
Thickness of tire or rim "B".....
Width of tire or rim "C".....
Flange, thickness "E"..... Height "F".....

CAR AND BOLSTER DATA

Center to center of car bolsters "A".....
Length of car over all "B".....
Length of body over corner posts "C".....

CAR AND BOLSTER DATA—Continued

Wheel base of truck "D".....
Height from rail to bottom of side sill "E".....
Depth of side sill "F".....
Distance between steps or running board "K K" "L"..
Width of car body bolster "R".....
Thickness of bolster at center "T".....
Thickness of bolsters at ends "S".....
Centers of side bearings "V".....
Height from rail to car body side bearings "Y".....
Height from rail to car body bolster "Y Z".....

AXLE DATA

Journals, diameter "I"..... Length "J".....
Wheel seat, diameter "K"..... Length "M".....
Diameter of motor bearing "U".....
Gear seat, diameter "S"..... Length "T".....

For explanation of dimensions required, see sketches on page 114.

Requests for propositions should give as much of the above data as possible.

WALSCHAERT VALVE GEAR

A PAPER READ BEFORE THE
EIGHTH BIENNIAL CONVENTION

BROTHERHOOD OF LOCOMOTIVE ENGINEERS
COLUMBUS, OHIO, MAY 1908

By C. O. ROGERS
TRAVELING ENGINEER, AMERICAN LOCOMOTIVE COMPANY

10033



AMERICAN LOCOMOTIVE COMPANY
30 CHURCH STREET, NEW YORK CITY

THE CODE WORD FOR THIS PAMPHLET IS "CALECANNON"

Walschaert Valve Gear

A PAPER READ BEFORE THE EIGHTH BIENNIAL CONVENTION

BROTHERHOOD OF LOCOMOTIVE ENGINEERS

By C. O. ROGERS

Traveling Engineer, American Locomotive Company



THE Walschaert valve gear, though but lately introduced on any large scale in American locomotive practice, is as old a device as the Stephenson shifting link motion, with which every engineer is familiar. In 1844 Egide Walschaerts, at that time Chief Shop Superintendent of the Brussels Southern Railroad, invented the type of valve motion which bears his name. Because of the fact that the rules of the railway company did not allow a foreman in the shops to advertise a patent in Belgium to his own profit, the application for the patent was made by M. Fischer, Engineer of the State Railways of Brussels, a friend of Walschaerts', in the latter's name. The patent was granted by Royal Decree on Nov. 30, 1844, and the mechanism described in the patent resembles the motion which is now in use on many American locomotives. The so-called Stephenson shifting link motion

came into prominence a year earlier, or in 1843. The Walschaert valve gear attracted a great deal of attention in Europe and gradually became the accepted type of valve motion on the railroads of Continental Europe, just as the Stephenson link motion came into general use on American railroads.

Although there are a number of special cases in which the Walschaert valve gear has been applied to locomotives in this country as far back as 20 or 25 years ago, it is only during the last few years that it has been used in America on any large scale. With the increase in power and weight of the modern locomotive, however, conditions have arisen to meet which the American designer has turned to the Walschaert valve gear because it offers certain mechanical and structural advantages over the Stephenson motion.

Because of the increase in size of the parts, there is

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hardly room enough between the frames of a modern heavy freight or passenger engine for the accommodation of the Stephenson gear. The eccentrics are crowded together so that it is almost impossible for the engineer to give them proper inspection or lubrication. The Walschaert valve gear, on the contrary, being outside of the frames, is perfectly accessible, and can therefore be much more easily maintained.

With the high surface velocities of the largest sizes of eccentrics, it is difficult to keep them properly lubricated. With the Walschaert valve gear, there are no large eccentrics to keep lubricated; but with hardened pins and hardened bushings it has an important advantage in maintenance.

The Walschaert gear transmits the moving force to the valve in very nearly straight lines, so that there is less springing and yielding of the parts than in the Stephenson link motion.

The Stephenson link, under the influence of two eccentrics, moves through wide angles, resulting in a wedging action of the link block which strains the gear and produces lost motion. The Walschaert link, driven by a single eccentric, moves through smaller angles and produces less lost motion.

By removing the valve gear from between the frames, as we do in the case of the Walschaert gear, a better opportunity is afforded to introduce stronger frame bracing, and thus reduce the possibility of frame failures.

The Walschaert valve gear shows a distinct advantage over the Stephenson link motion as regards permanence of adjustment. When a large freight engine is half way between shoppings the Stephenson link motion is slack and loose, while the Walschaert valve gear is in as nearly good condition as when the engine left the shop; consequently the original steam distribution is much better maintained with the Walschaert than with the Stephenson motion.

These are some of the reasons why a large number of American railroads are now equipping their engines with the Walschaert valve gear. Seldom in the history of the development of the locomotive in this country has any improvement, once introduced, been so rapidly accepted as this type of valve motion; and, inasmuch as its use will undoubtedly increase, a clear understanding of its principles and construction is essential for all those who operate engines so equipped.

The best place to begin is always at the beginning; and as the Walschaert valve motion, like any other device, is

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merely a development of some simpler form, it is necessary in studying it to start with the original form and trace the various steps in the development.

Figure 1 represents the simplest form of valve motion; viz., a single eccentric of the return crank form, driving a plain normal valve without lap or lead by means of an

were open this engine could not start of itself, with another engine of the same kind connected to the wheel on the other side of the axle, and with the main pins at right angles to each other, as is the case in the locomotive, the valve of the left hand engine would be in a position to admit steam behind the piston and start the wheels turn-

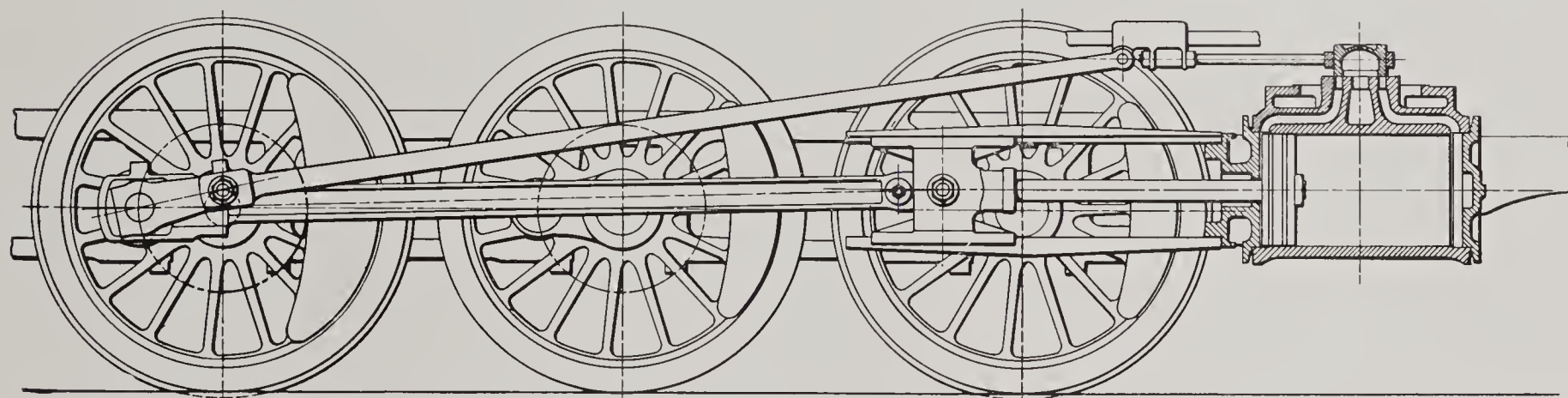
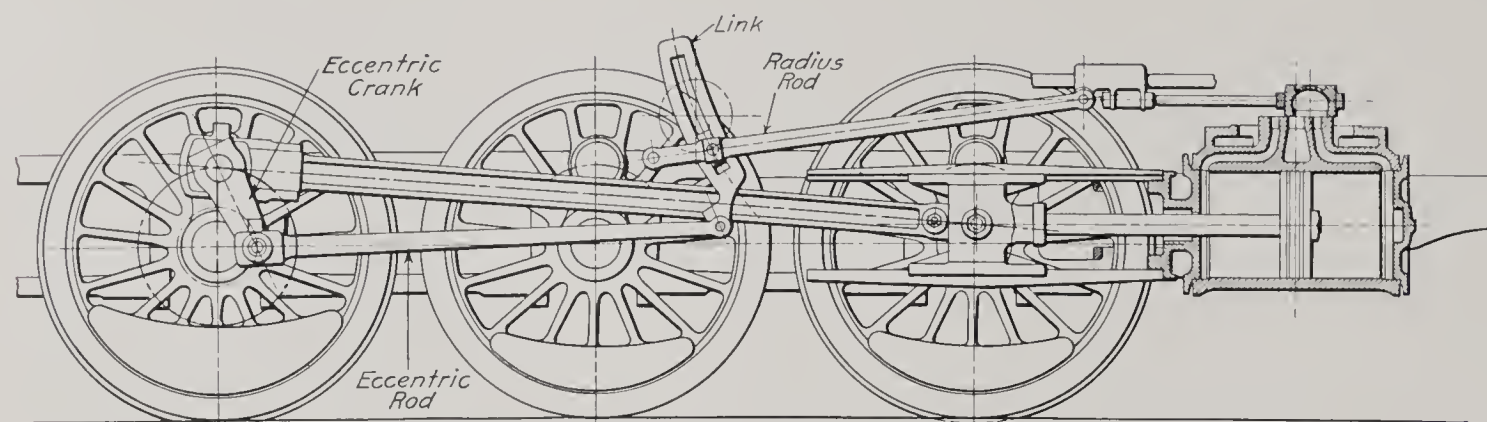


FIG. 1

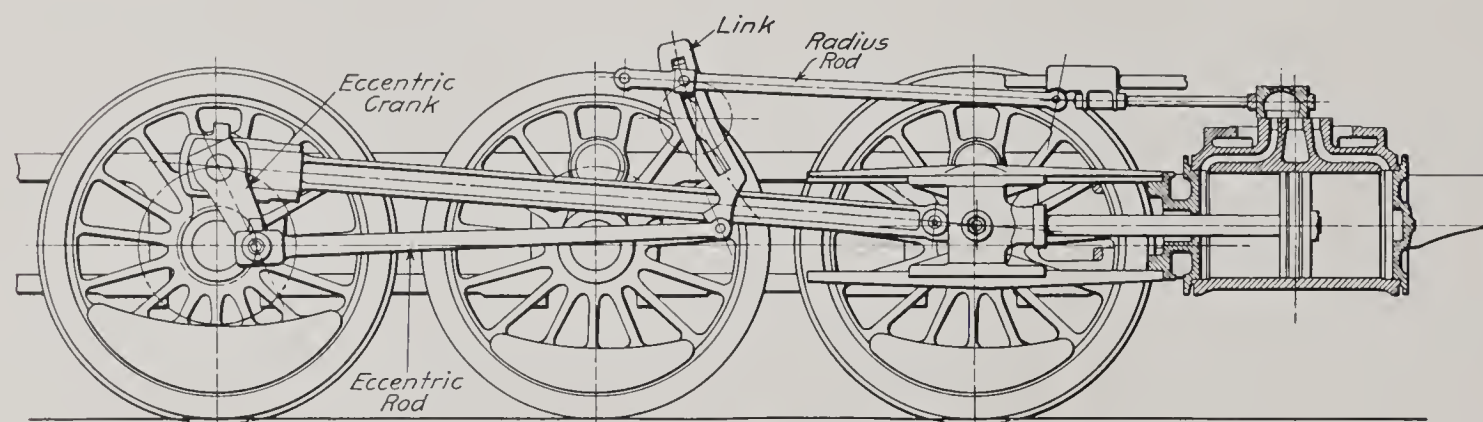
eccentric rod directly connected to the valve stem. Assuming that the engine is to run forward, with the main pin on the back center, as shown, the eccentric crank pin must be on the top quarter; in which case the valve will be in the central position on its seat with all ports closed. Although it is apparent that if the throttle

ing to the right. The eccentric crank on the engine which is shown would then move the valve forward, uncovering the back steam port and admitting steam behind the piston, and the engine would run forward. It is perfectly evident, however, that this engine will only run in one direction; for if, to start it backward, the

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A



B

FIG. 2

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wheel was pinched to the left, with the eccentric in the position as shown, the valve would be moved to the left and steam admitted ahead of the piston, forcing the crank pin back again to its position on the back center. In order to make the engine run backward, the eccentric would have to be in the opposite position from that which it occupies, or on the lower quarter; in which case as the wheel was turned to the left or backward the eccentric would be a quarter of a revolution ahead of the main pin and move the valve forward, opening up the back port and admitting steam behind the piston as is necessary.

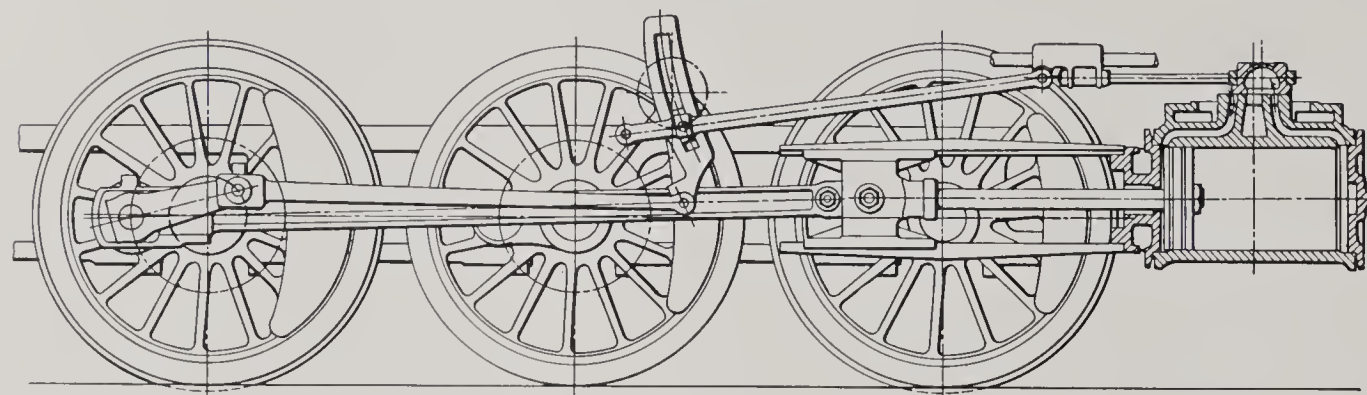
The first thing to do in the development of this simple form of engine, therefore, is to introduce some means by which it can be reversed. This can be accomplished by introducing a beam between the eccentric and the valve stem, pivoted at its center so that one end moves with and in the same direction as the eccentric and the other end in exactly the opposite direction.

Such a construction is shown in figure 2. With the valve stem at the lower end of the link and the main pin on the upper quarter, as shown in diagram "A," the eccentric will have moved the valve to its extreme forward position and the back port will be opened for the admission of steam behind the piston and the engine will run forward. If, however, with the main pin and eccen-

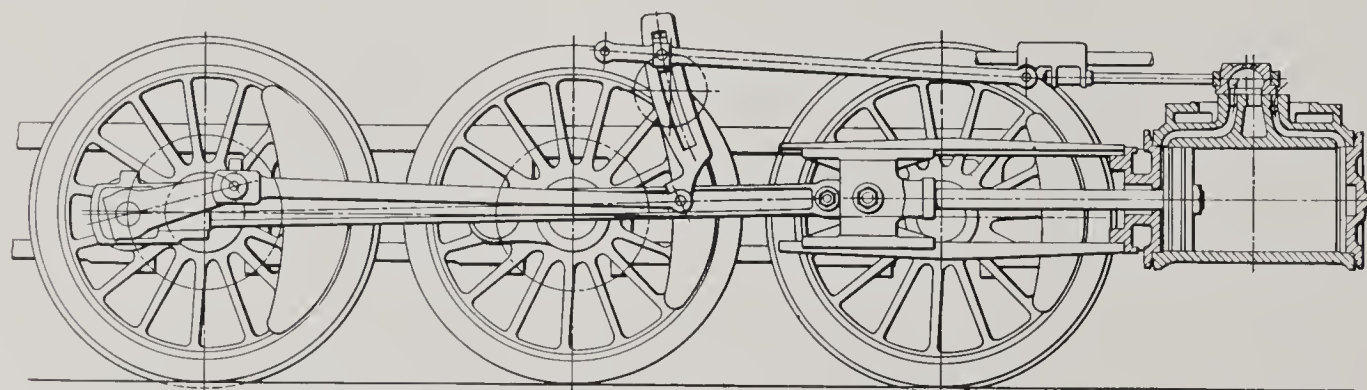
tric crank in the same position, the valve stem was connected to the upper end of the link, as shown in diagram "B," the valve would be moved to its extreme position to the left and the front port would be opened and steam admitted ahead of the piston and the engine would run backward. With a flexible valve stem, or radius rod, connected to a block which slides in a curved slot in the beam, or link, as shown, and with the necessary mechanism for raising and lowering the block, it is evident that we now have an engine that can be reversed.

This engine, however, is still far from an efficient machine; for, as the valve does not close the port for the admission of steam until it is in its central position on the seat; and, as with the eccentric only a quarter of a revolution ahead of the main pin, it is not in this position until the main pin is on the center, whatever the travel of the valve, steam will be admitted to the cylinders throughout the full stroke of the piston, and the engine will use as much steam working against a light as against a heavy load. In order to govern the period for the admission of steam, or, in other words, give a variable cut-off, the valve must be redesigned so that it will close the steam port before it reaches its central position; that is, it must be given "lap," the lap of a valve being that portion of it which over-laps the steam ports when it is

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A



B

FIG. 3

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on its central position on the seat. But with lap given to the valve and also "lead," which is the width of the opening of the steam port given by the valve when the piston is at the beginning of its stroke, the valve motion must be so changed that the valve will be advanced from its central position on the seat a distance equal to the amount of the lap plus the lead, when the crank pin is on either of the centers.

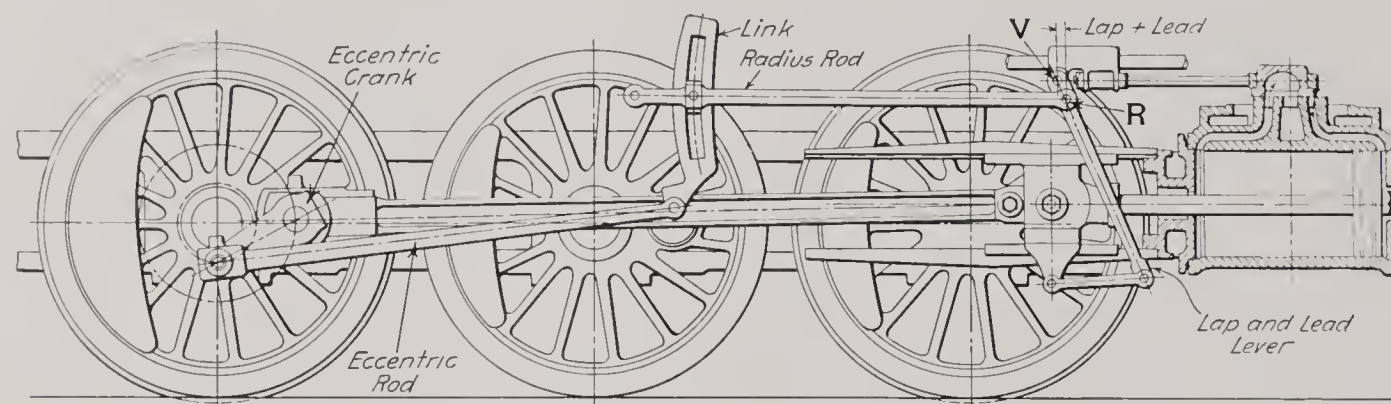
It is apparent, from an examination of figure 3, that this advance of the valve cannot be obtained by any change in the position of the eccentric crank relative to the main pin. Figure 3 shows the same valve motion as was shown in figure 2, except that the valve has one inch outside lap and the eccentric crank has been advanced to more than a quarter of a revolution ahead of the main pin. If then the link block is at the bottom of the link, as in position "A," the advance given to the eccentric will have moved the valve forward a distance equal to the lap plus the lead, and the back port will be opened for the admission of steam and the engine will run forward. If, on the other hand, the link block is moved to the upper end of the link, as shown in position "B," the advance given to the eccentric crank will have had the opposite effect and the front port will be opened and the reversibility of the engine thus destroyed. In order to provide lead,

therefore, in any engine where there is but one eccentric, some means must be employed other than advancing or receding the position of that eccentric relative to the main pin; if there is to be any method of reversing the engine.

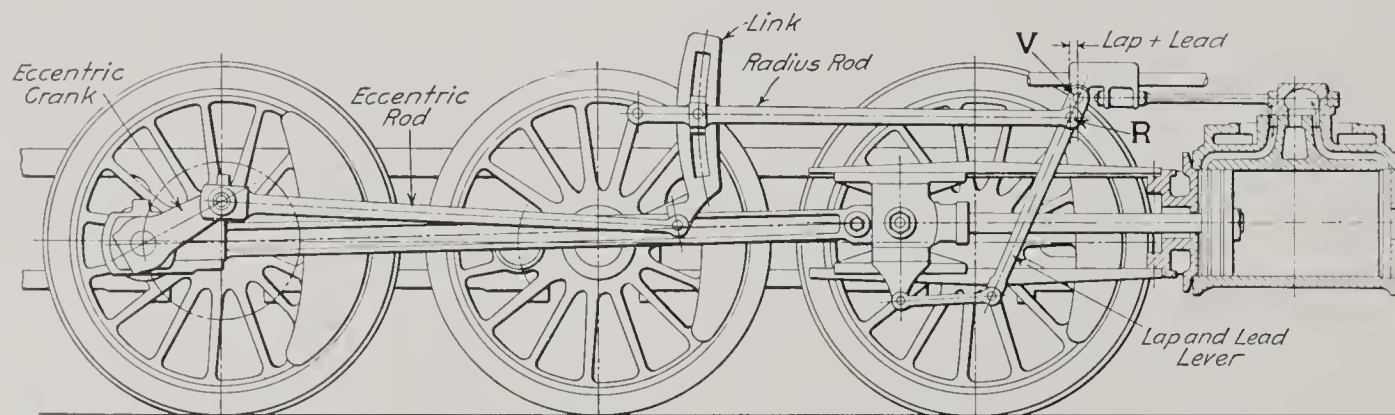
In the Walschaert valve gear the motion for providing lap and lead to the valve is derived from the main pin by suitable connections with the crosshead.

This brings us to the next step in the development of the Walschaert valve gear and the introduction of the lap and lead lever. Suppose that our link block is in the center of the link as shown in position "A," figure 4. As the center of the link block coincides with the center of the link support, there will be no movement of the radius rod as the link swings back and forth through the action of the eccentric. If then the radius rod was connected with the lap and lead lever at the point "R;" and the upper end of the lever was connected to the valve stem crosshead at "V;" and the lower end to the crosshead arm by means of a short link, as shown, as this latter moves back and forth, the point "R" being fixed, the point "V" will rotate about it and the valve will be moved back and forth. With the main pin on the forward center, as shown in position "A," the angle assumed by the lap and lead lever has moved the valve back a

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A



B

FIG. 4

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sufficient distance to uncover the front port. With the main pin on the back center, as shown in position "B," the lap and lead lever is inclined in the opposite direction and the valve moved forward, and the back port is open. This is the way the Walschaert valve gear derives its

not vary as the reverse lever is hooked up will be shown later on.

The position of the eccentric crank relative to the main pin depends on which end of the link is used for forward motion. If the forward motion is taken from the bottom

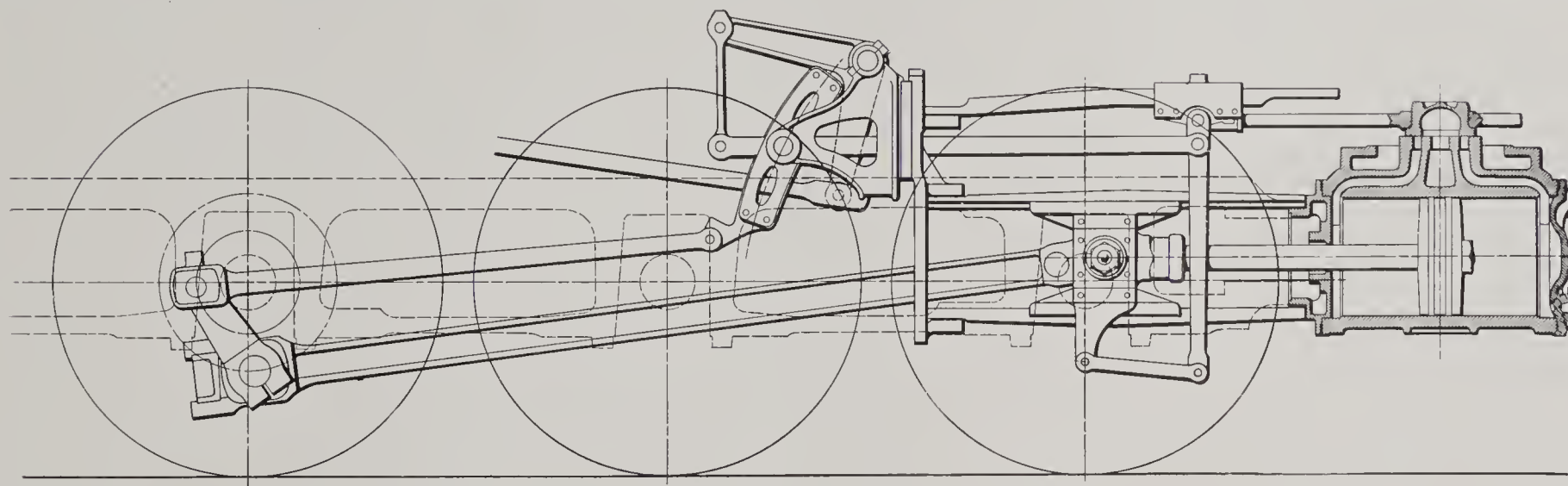


FIG. 5

lead. The distances between the connecting points of the lap and lead lever must be so proportioned that the travel of the crosshead from one end of the stroke to the other will give a travel to the valve equal to twice the lap plus the lead. That this lead is permanent and does

of the link, as is usually the case, the eccentric crank is a quarter of a revolution ahead of the main pin when the wheel is running forward, if the valves have outside admission; and a quarter of a revolution behind it, if the valves have inside admission. If the top of the link is

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used for forward motion, the eccentric crank is a quarter of a revolution behind the main pin, if the valves have outside admission; and a quarter of a revolution ahead of it, if the valves have inside admission. In all cases, if the valves have outside admission, the radius rod is

reversible and has a variable cut-off. It only remains to provide the necessary reversing mechanism and we have the Walschaert valve gear in its complete form as shown in figure 5, which represents its application to a consolidation engine.

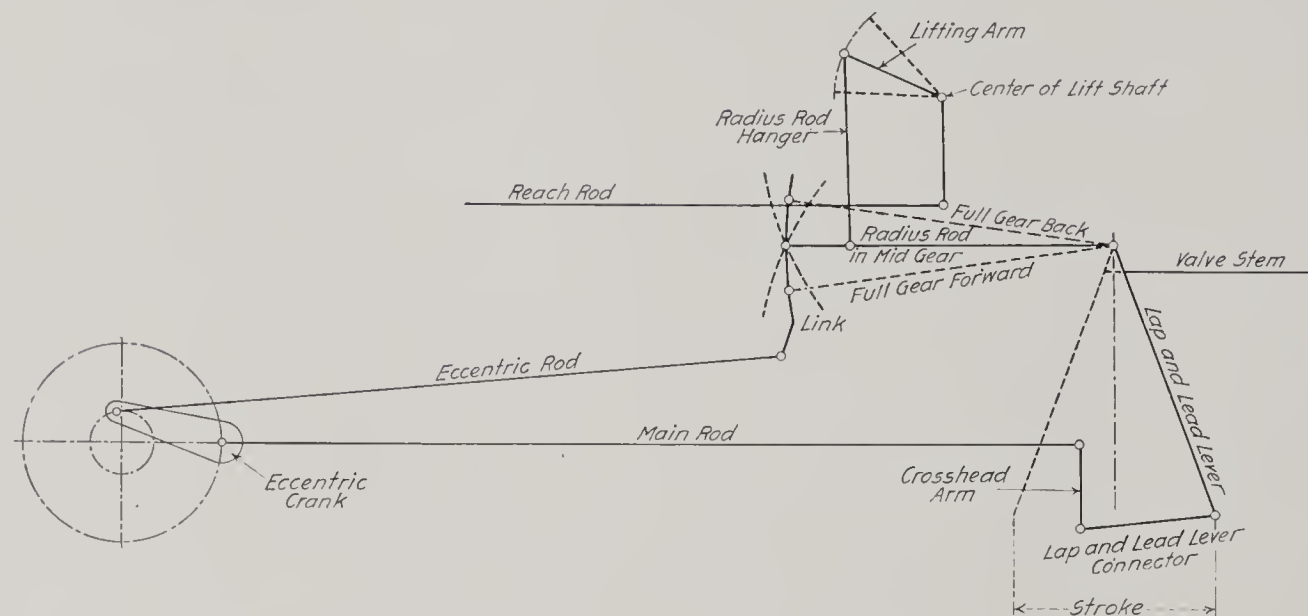


FIG. 6

connected to the lap and lead lever below the valve stem, and above it, if the valves have inside admission.

The simple form of direct valve motion, shown in the first figure, has now been so modified that the engine is

Figure 6 shows a general outline of the gear as arranged for inside admission valves on which are given the names of the various parts as recommended by the American Railway Master Mechanics' Association. Starting

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at the crank pin, we have the eccentric crank, eccentric rod, link, reach rod, lift shaft, radius rod hanger, radius rod, lap and lead lever, lap and lead lever connector, and crosshead arm.

Having studied the functions of the different parts of the Walschaert valve gear, it remains to trace the movement of the valve through a complete revolution of the wheel. Figures 7, 8, 9 and 10 (Pages 14 to 17) show a series of diagrams representing different positions of the valve for different positions of the crank pin. For the sake of simplicity, the valve and cylinder are shown in section, while the other parts of the gear are represented by their center lines and center points only. As will be apparent, these diagrams are out of proportion, the valve and the eccentric throw having been enlarged in order to bring out more clearly the positions of the edges of the valve relative to the edges of the cylinder ports. In figure 7, the valve is outside admission and the motion is represented as being in full forward gear; or with the reverse lever in the extreme forward position. Figure 8 represents the same valve motion, but in this case the reverse lever is hooked up and the link block is nearer the center of the link and the engine is cutting off at about 25% of the stroke. Figures 9 and 10 represent a valve motion as arranged for an inside admission piston

valve; in figure 9, the motion being in full gear forward; while in figure 10 it is represented with the reverse lever hooked up.

As has already been shown, the valve receives its motion from two distinct sources: first, from the eccentric crank which gives the long travel to the valve; and second, from the crosshead by means of the lap and lead lever, which would give a short travel to the valve even if the eccentric rod was disconnected.

Starting with diagram 1, figure 7, as the valve is outside admission, with the main pin on the back center, the eccentric crank is on the top quarter, or a quarter of a revolution ahead of the pin, and the radius rod is connected to the lap and lead lever below the valve stem. The link is in its central position, and the valve would be in its central position on the seat; if it were not for the motion given to it by the lap and lead lever. As it is, however, the crosshead being at the back end of the stroke, the lower end of the lap and lead lever is at its extreme back position and the angle assumed by the lever has moved the valve forward, as indicated by the arrow, a distance equal to the lap of the valve plus the lead. Going to diagram 1, in figure 8, the main pin, eccentric crank and crosshead are in the same position as they were in the corresponding diagram in

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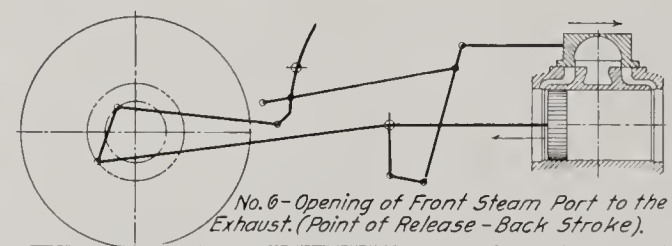
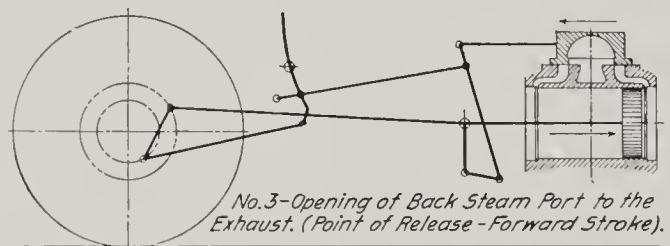
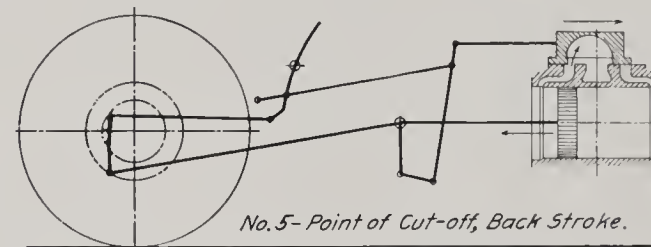
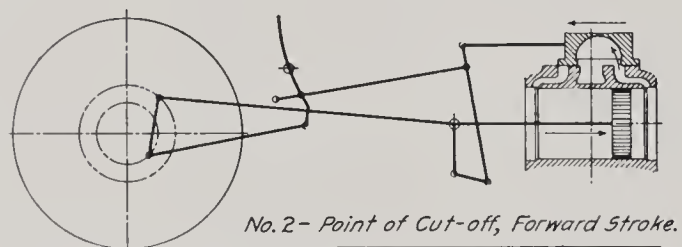
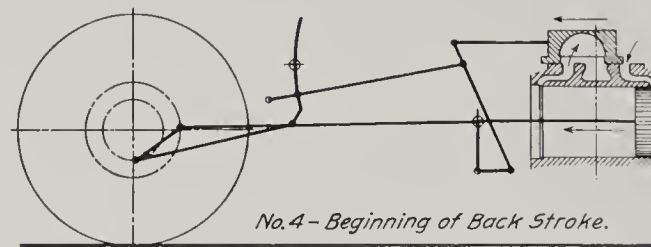
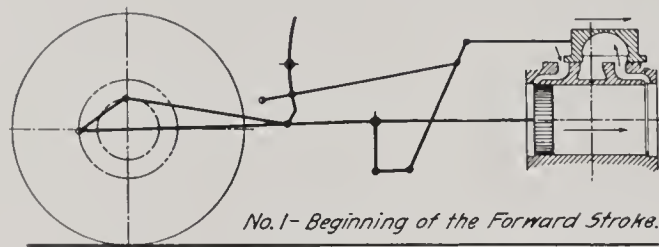


FIG. 7

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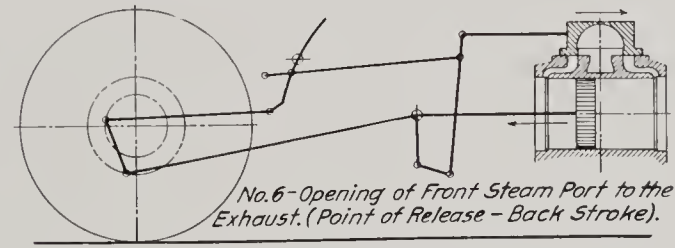
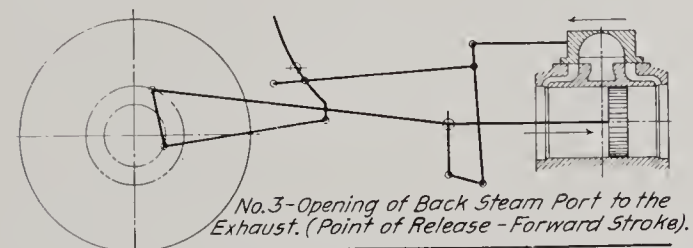
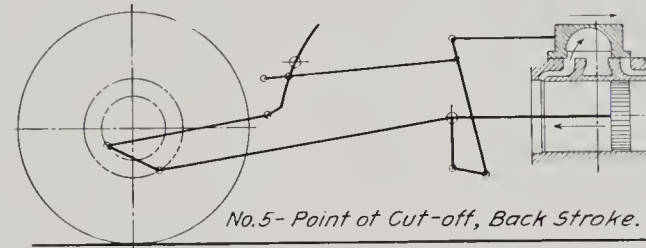
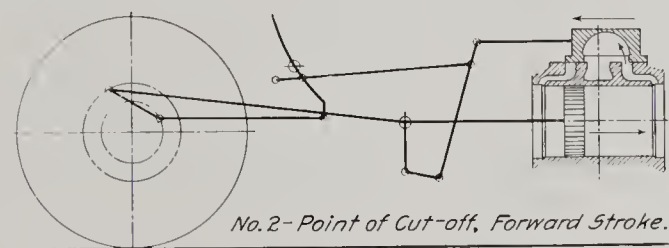
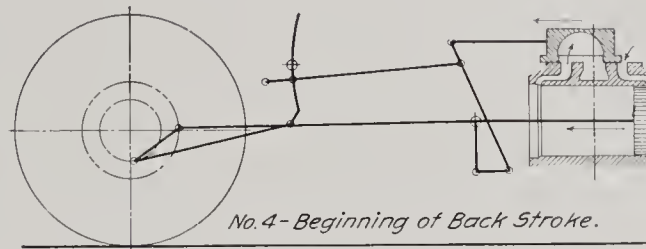
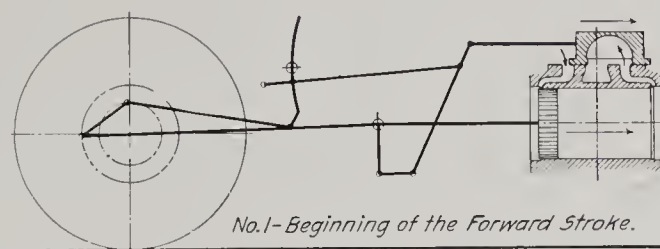


FIG. 8

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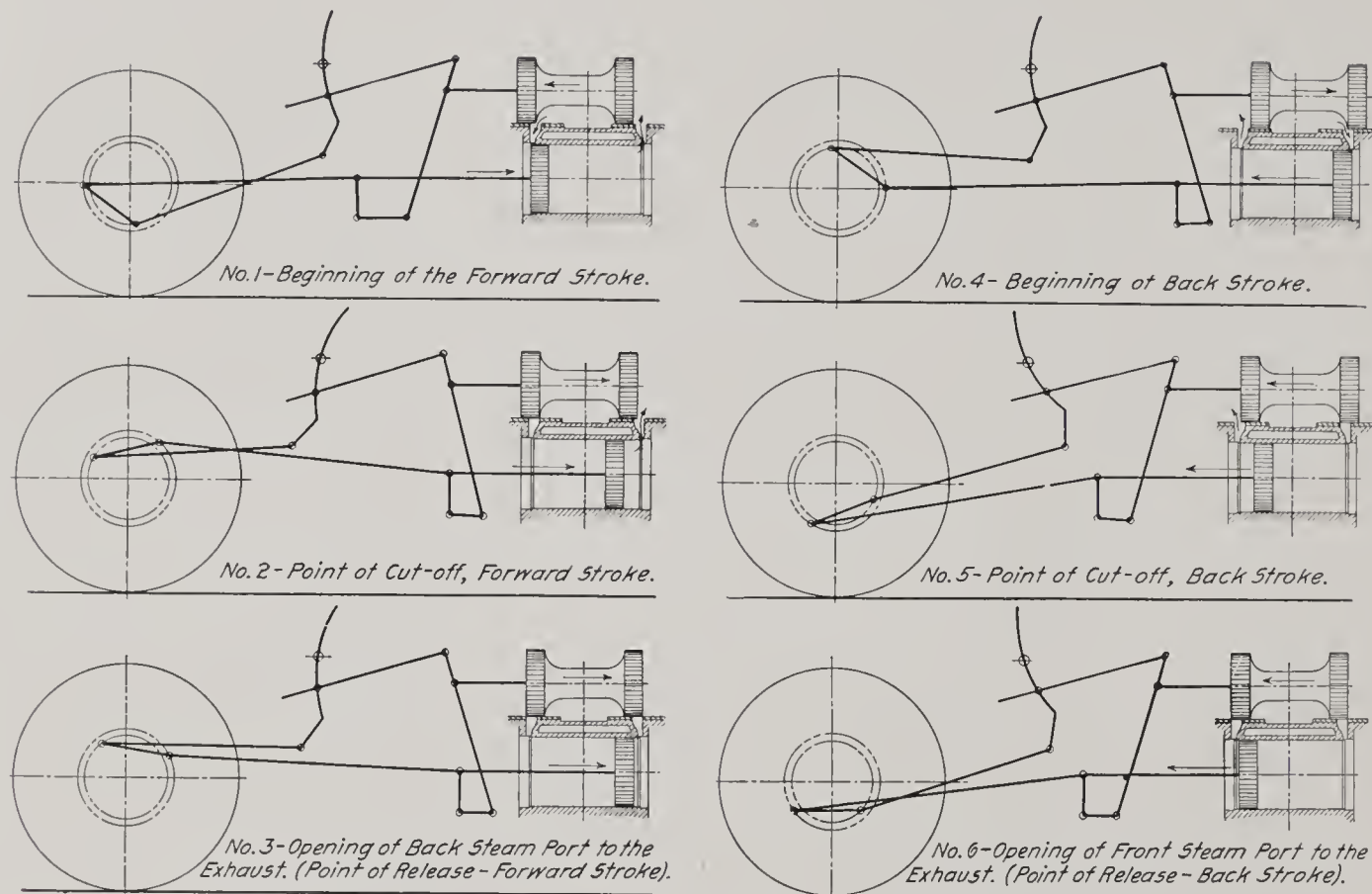


FIG. 9

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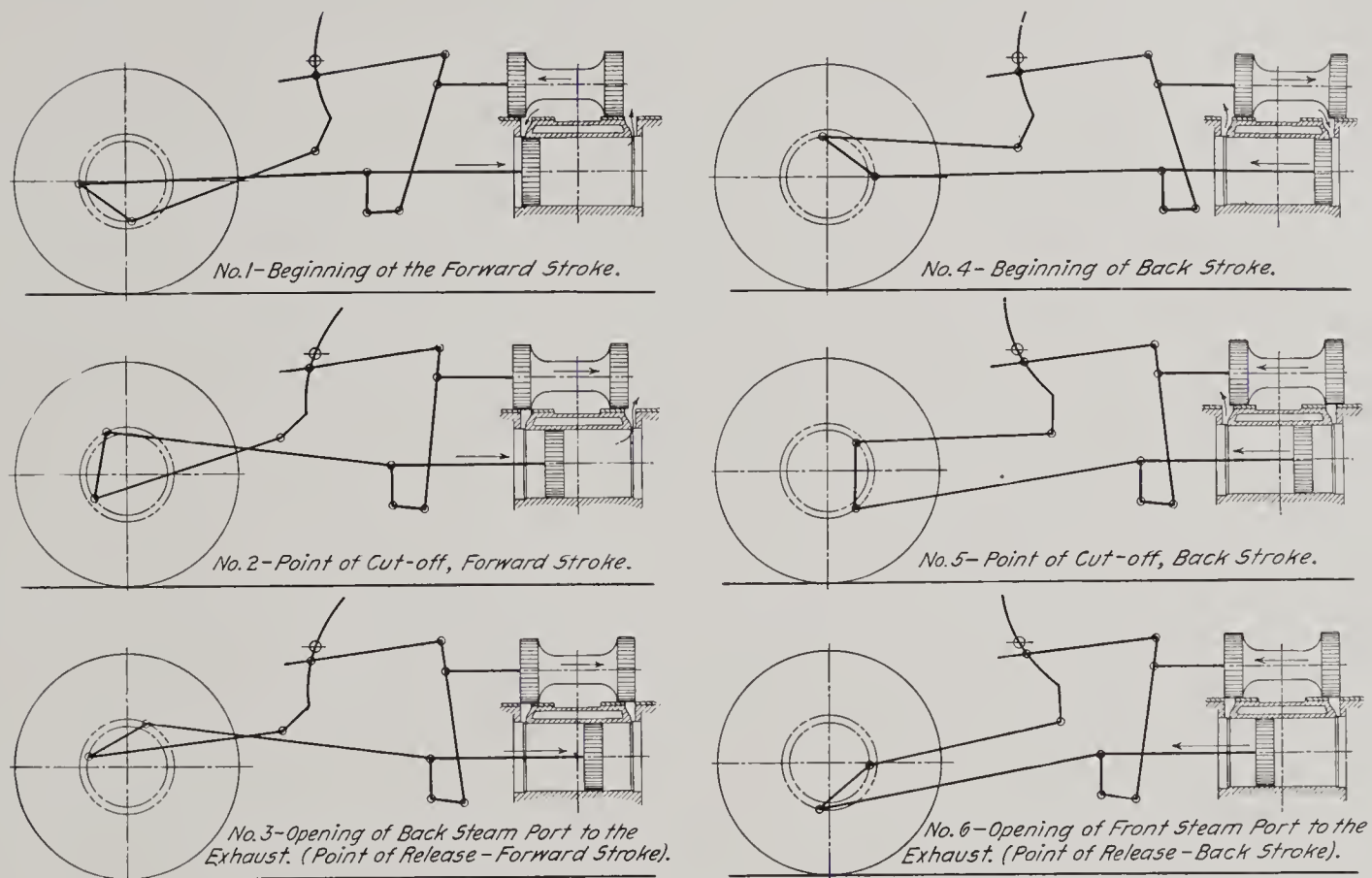


FIG. 10

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figure 7; and the link is in its central position. Thus, although the link block is nearer the center of the link, the radius of the link being equal to the length of the radius rod, the front end of the radius rod is the same horizontal distance from the center of the crosshead as it is in diagram 1, figure 7; consequently the angle assumed by the lap and lead lever is the same and the valve has been moved forward the same distance from its central position, and the lead is the same as it is with the reverse lever in full gear.

In figures 9 and 10, diagram 1 in each case represents the position of the valve at the beginning of the forward stroke; the same as the corresponding diagrams in figures 7 and 8. As the valves are inside admission, however, the radius rod is connected to the lap and lead lever above the valve stem. The valve, in each case, has thus been moved back, instead of forward, by the movement of the lap and lead lever; and the back port is open to the live steam and the front port, to the exhaust.

Going back to figure 7; in diagram 2, the piston has moved forward a distance equal to about 85% of the stroke; the valve has traveled to its extreme forward position and back again, as indicated by the arrow, till it has just closed the back steam port; while the front

port is still open to the exhaust. In other words, the valve is at the point of cut-off. In diagram 3, the piston has moved still nearer to the forward end of the stroke. The exhaust edge of the valve is now in line with the edge of the back steam port; so that any further movement will open communication with this port and the exhaust. The front port, on the other hand, has been closed to the exhaust and whatever steam is ahead of the piston will be compressed. In diagram 4, the piston is at the extreme forward end of the stroke; the angle assumed by the lap and lead lever has moved the valve back a distance equal to the lap plus the lead; the front port is open for the admission of steam and the back port is open to the exhaust. In diagram 5, the piston is moving toward the back end of the cylinder and the valve has just closed the front port to the admission of steam, showing the cut-off position of the valve on the back stroke. In diagram 6, the piston is very nearly at the end of the back stroke and the valve is about to open the front port to the exhaust; while the back port is closed to the exhaust and compression is taking place in the back end of the cylinder.

As the diagrams in figures 8, 9 and 10 represent the same valve events as the corresponding diagrams in fig-

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ure 7, it will not be necessary to examine them separately. It will be noticed that in figures 8 and 10 the valve cuts off the steam from the cylinders and opens the steam ports to the exhaust at a much earlier period in both the forward and back stroke than it does in figures 7 and 9, which shows the effect of hooking up the reverse lever.

These diagrams show very plainly the difference in the arrangement of the Walschaert valve gear for outside and inside admission valves, also the fact that the lead of the valve is the same for all cut-offs.

To change the lead of the Walschaert valve gear, it is necessary to either change the lap of the valve, reducing it to increase the lead and increasing it to reduce the lead, in which case the cut-offs will occur at later or earlier periods in the stroke, respectively; or to change the lengths of the arms or distances between the connecting points of the lap and lead lever. Increasing the distance between the radius rod connection and the valve stem connection to the lap and lead lever would increase the lead; or shortening this distance would decrease the lead.

Just here it might be of interest to study some of the ordinary forms of construction of the various parts of the gear.

In figure 11, are shown an eccentric crank and eccentric rod. The eccentric crank, as will be seen, is secured

to the extension of the main crank pin by a binding bolt. The crank is split so that it can be drawn to a tight bearing by means of the bolt. This bolt, together with a key, keeps the eccentric crank fixed in its position on the main pin. By driving out the binding bolt, the eccentric crank may be taken off if necessary. This construction permits of using a solid bushing on the side rod at the main crank pin.

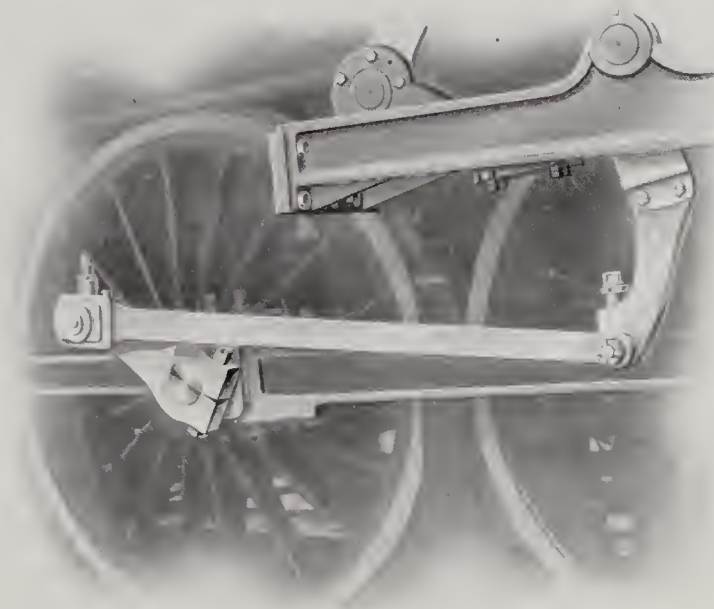


FIG. 11

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The link and reverse shaft are shown in figure 12. In this design of gear, the radius rod is directly connected to the lift shaft arm by means of a slip block, which makes a very simple arrangement.

Figure 13 shows another style of reversing mechanism. In this design, the backward extending arm of the lift shaft is connected to the back end of the radius rod by means of a link.

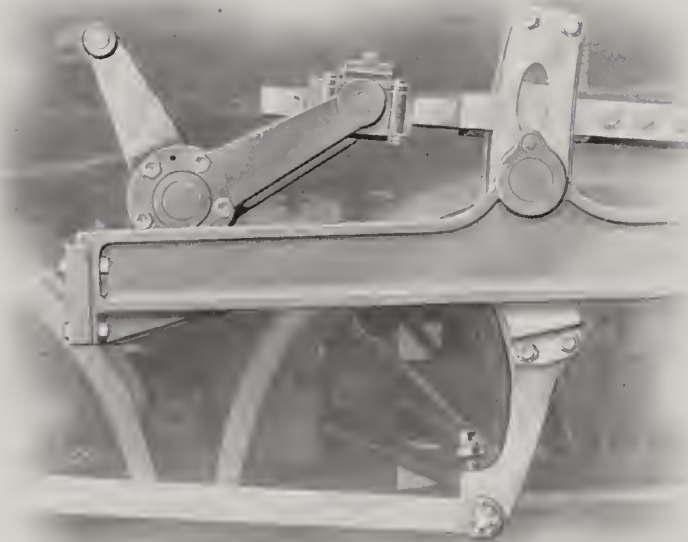


FIG. 12

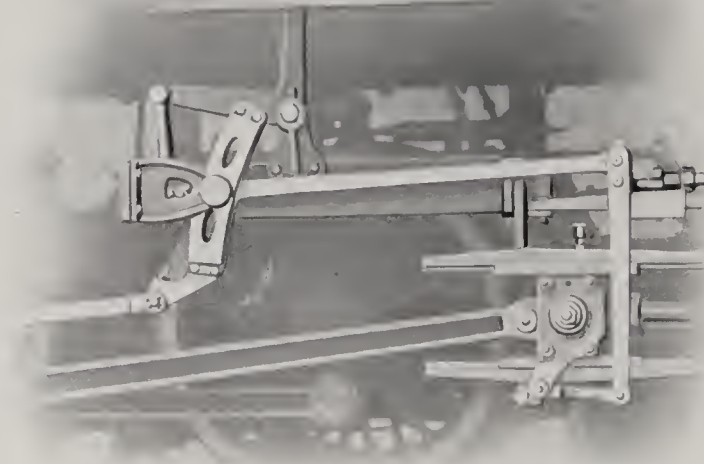


FIG. 13

In figure 14 are shown the parts of the Walschaert valve gear connecting the valve stem and the crosshead. It will be noticed that the radius rod connection with the lap and lead lever is above the valve stem connection, showing that the valve is inside admission.

Having considered the principles of the Walschaert valve motion, the next phase of the subject to take up, and that which is of most interest to all engineers, is—

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what may be done in case of a breakdown. It would be impossible to lay down rules to cover every case that might arise; but we can take up some of the more usual or most possible failures and consider the best and quickest course to follow in such cases.

Suppose, for instance, an eccentric crank, eccentric rod, or the foot of the link is broken; or one of the link trunnions twisted off, the other trunnion holding the link in position. In such cases, take down the eccentric rod, disconnect the back end of the radius rod from the lift shaft arm and secure the link block in the center of the link. With the motion disconnected and blocked in this way, the valve on the lame side receives a travel from the lap and lead lever equal to twice the amount of the lap plus the lead, which gives a port opening equal to the amount of the lead. This permits of leaving the main rod up and running in with both sides; as the cylinders can be lubricated and, though the cut-off will be very short on the disabled side, the steam that is admitted will do a certain amount of work and the engine can be reversed.

Figure 15 shows an engine with the valve gear disconnected and blocked as just described. In the design illustrated, the radius rod is connected to the lift shaft arm by means of a radius rod hanger so that it can be readily disconnected by taking out the pin connecting the radius

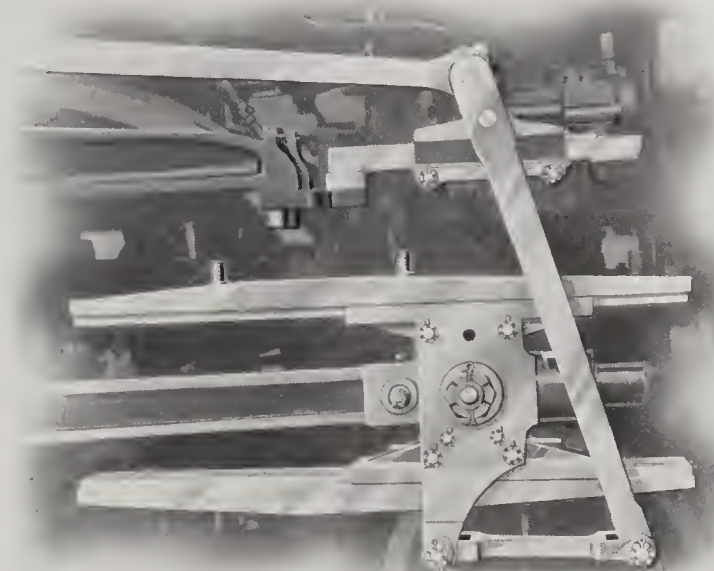


FIG. 14

rod hanger and the lift shaft arm. The link block is secured in the center of the link by means of the two blocks shown, one placed below and the other above the link block and securely wedged in position.

With the link block secured in the center of the link, care must be taken in making a stop that the main pin on the lame side is not on either quarter; as, in this case, the lap and lead lever would be in a perpendicular posi-

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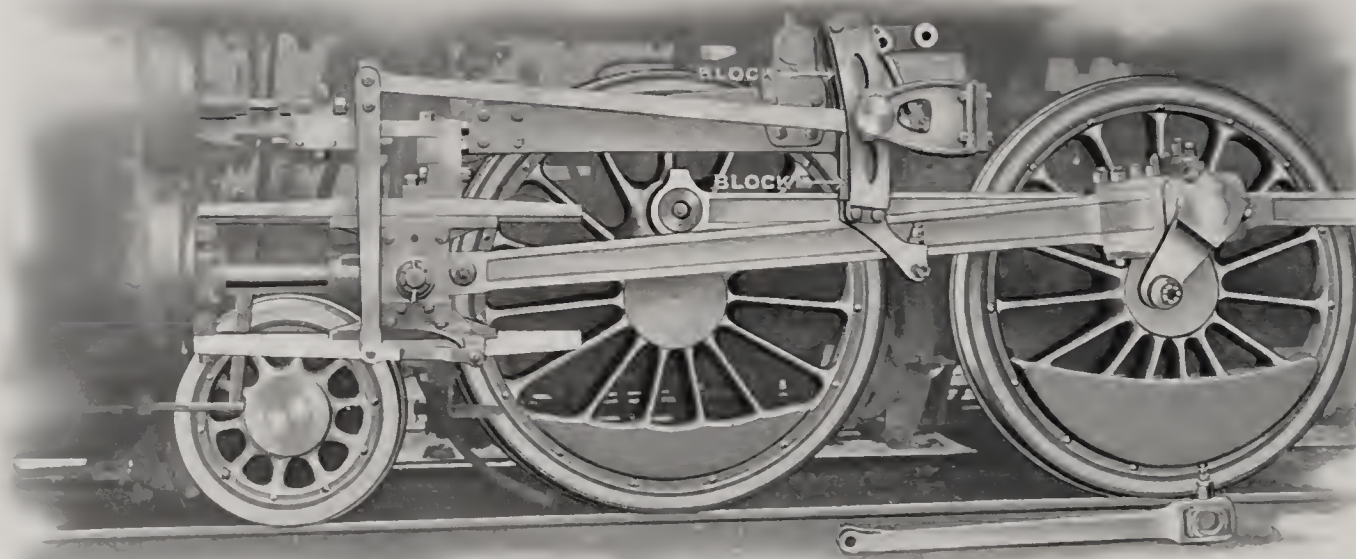


FIG. 15

tion, as shown in the illustration, and the valve would be central on the seat; and, as the pin on the other side would be on the dead center, it would be impossible to move the engine.

In some arrangements of the Walschaert valve gear, the radius rod is directly connected to the lift shaft arm by means of a slip block or crosshead. It is common

practice in such cases to make the lift shaft arm in two pieces so that the radius rod may be easily disconnected from it, as shown in figure 16. Remove the outer section of the lift shaft arm, take off the cap of the slip block, lift out the end of the radius rod and remove the slip block. The parts that it is necessary to take down are shown in the foreground. The link block is secured

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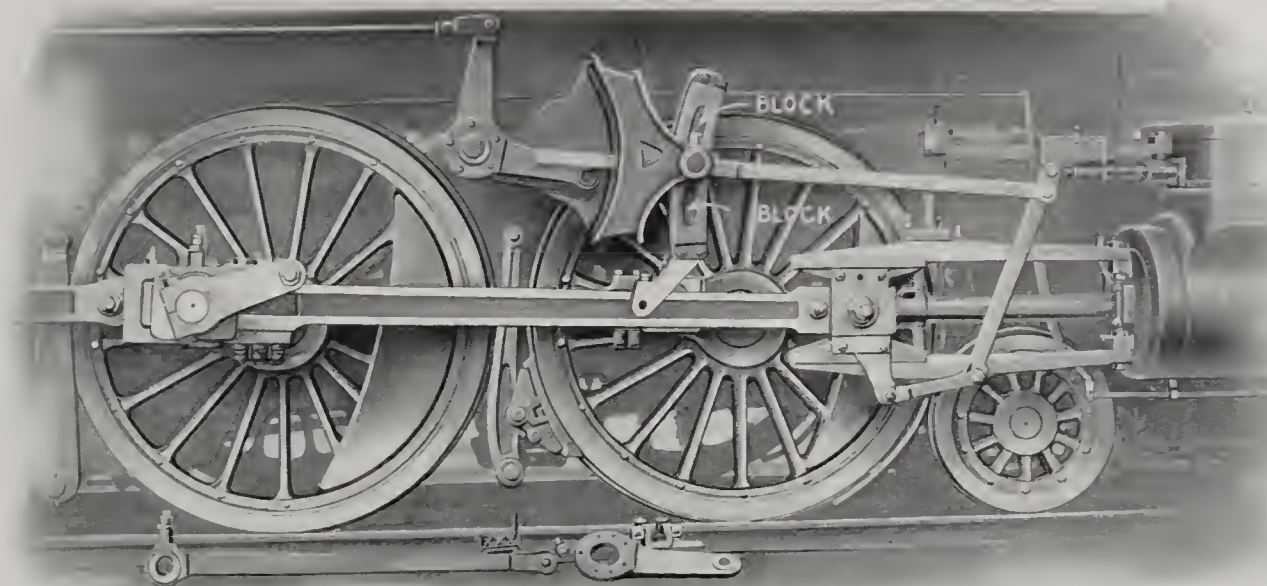


FIG. 16

in the center of the link in the same way as in the previous case.

So far, we have not considered any accidents which would require blocking the valve to cover the ports. In all cases where this is necessary, if the engine has no relief valves in the cylinder heads to remove, it is good practice to take down the main rod on the disabled side.

Suppose, for instance, the main rod was broken, or

the piston rod bent, or a cylinder head knocked out. In any of these cases, if the valve has inside admission and there are no relief valves in the cylinder heads, the engine may be disconnected and blocked, as shown in figure 17. Disconnect the front of the radius rod from the lap and lead lever and suspend it clear of the latter by means of a wire or chain from some convenient support. Secure the valve to cover the ports. This can usually be

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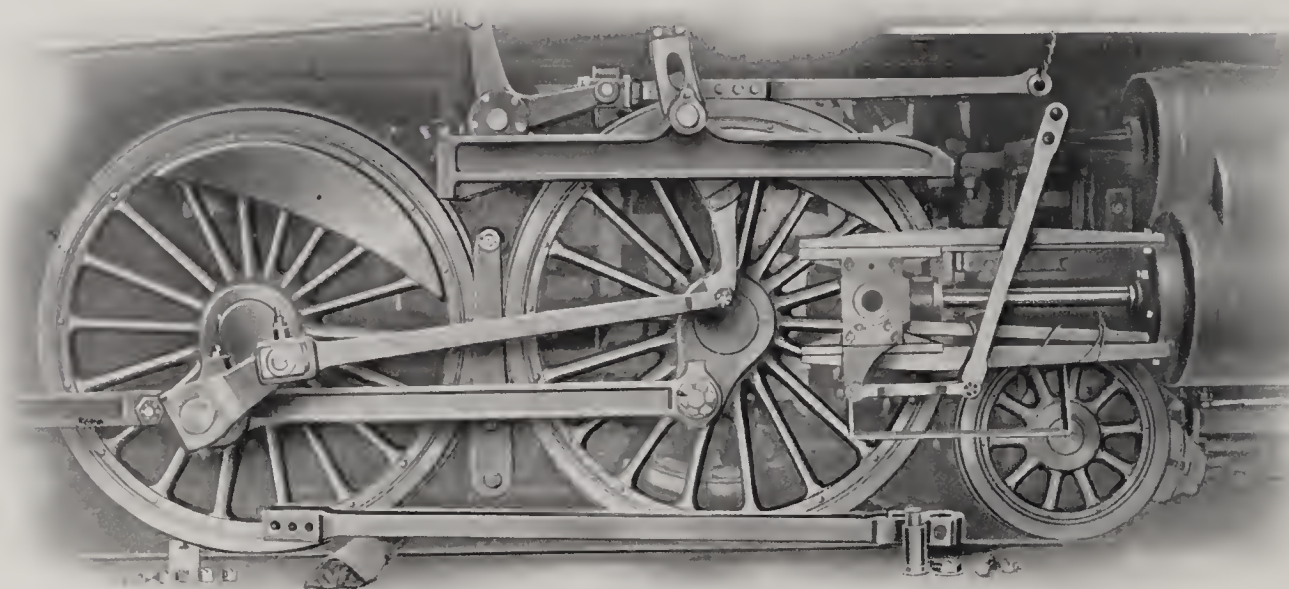


FIG. 17

done by means of the set screw provided in the valve stem crosshead for this purpose; but, if there is no such set screw, the valve stem crosshead may be blocked. Take down the main rod and block the crosshead at the back end of the guides, as shown. With the valve motion disconnected in this way, the reverse lever is free to operate the other side and the engine can be run in on one side. If the crosshead arm, lap and lead lever con-

nector, or lap and lead lever is broken, the engine might be blocked in the same way is illustrated in figure 17; except that, of course, such of the broken parts should be removed as would in any way interfere with the running of the engine.

If the valves have outside admission and there are no relief valves in the cylinder heads, in cases where it is necessary to secure the valve to cover the ports such as

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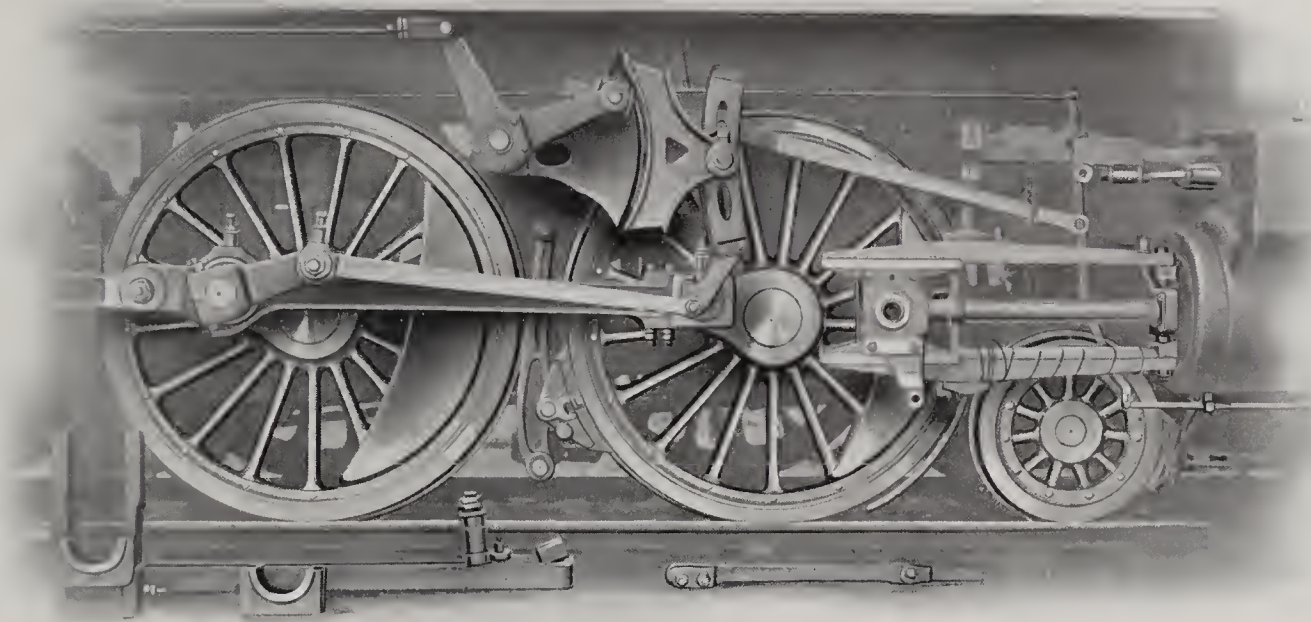


FIG. 18

have been considered, the engine might be disconnected as shown in figure 18. Disconnect the radius rod from the lap and lead lever and take down the latter; as, otherwise, the front end of the radius rod would strike the lever as the radius rod moves back and forth to the motion of the link. Suspend the front end of the radius rod from the valve stem crosshead guide, using for this purpose a

wire or chain (the fire door chain if no other is at hand). Secure the valve to cover the ports and take down the main rod and block the crosshead at the back end of the guide.

If the engine has cylinder relief valves and the main rod and piston on the disabled side are in condition to run, the main rod may be left up when the valve is

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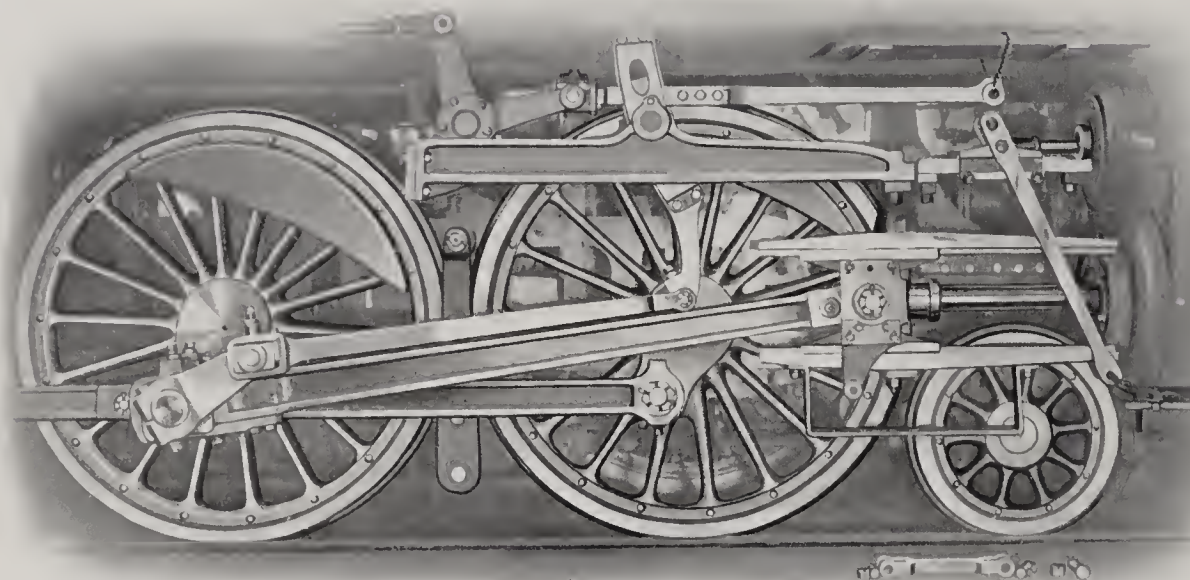


FIG. 19

secured to cover the ports. In that event, remove the relief valves from the cylinder heads to relieve compression and also permit of lubricating the cylinder.

Suppose, for instance, the lap and lead lever, lap and lead lever connector, or crosshead arm were broken; an engine with inside admission valves and relief valves in the cylinder heads could be blocked, as shown in figure

19. Disconnect the radius rod from the lap and lead lever and suspend it clear of the latter, as shown. Secure the valves to cover the ports. Tie the lower end of the lap and lead lever ahead by means of a rope secured to the cylinder cocks. Take out the relief valves, as previously recommended. The engine can then be run in on one side.

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If the valves were outside admission, under the same conditions as assumed in the case illustrated in figure 19, the main rod could be left up and the engine disconnected in the same way; except that the lap and lead lever would have to be taken down in order to clear the radius rod.

valve gear is not of as much interest to the engineer as to the "back shop" or round house man, a few general instructions in regard to setting the valves may not be out of place here.

1. Ascertain by the following method the position of

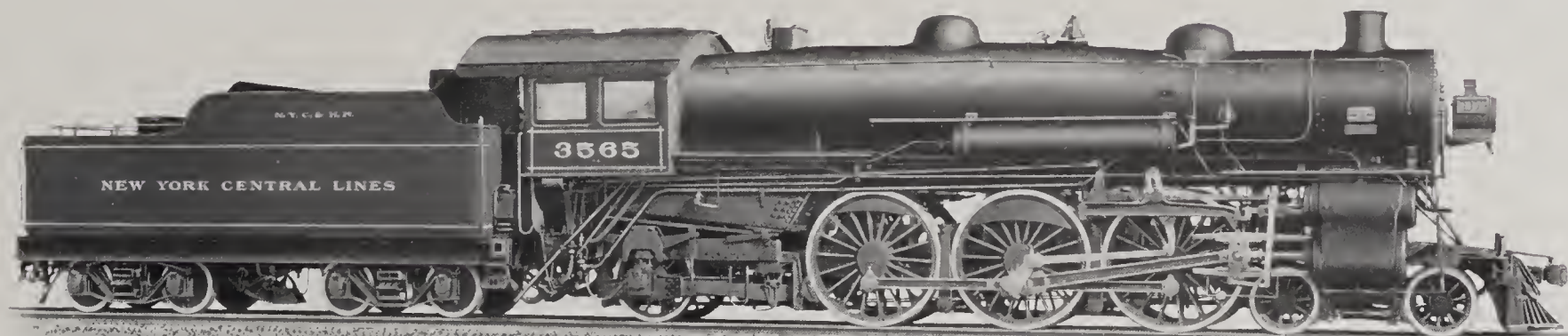


FIG. 20

We have not attempted to enumerate all the accidents that might occur on the road; but we trust that the explanation of what may be done in the cases considered will assist the engineer to meet any troubles that might possibly happen to the Walschaert valve motion.

Although the method of adjusting the Walschaert

the eccentric crank: Mark the position of the link on both of the dead centers of the main crank. If the position of the link is the same in both cases the eccentric crank position is correct; if not, the eccentric crank should be shifted until this occurs.

2. After the eccentric crank has been correctly set,

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the eccentric rod should be lengthened or shortened, as may be required, to bring the link in its middle position when the main crank is on either of its dead centers, so that the link block may be moved from its extreme forward to its extreme backward position without im-

3. The difference between the two positions of the valve on the forward and back centers of the engine is the lap and lead doubled; it is the same in any position of the link block, and cannot be changed without changing the leverage relations of the lap and lead lever.

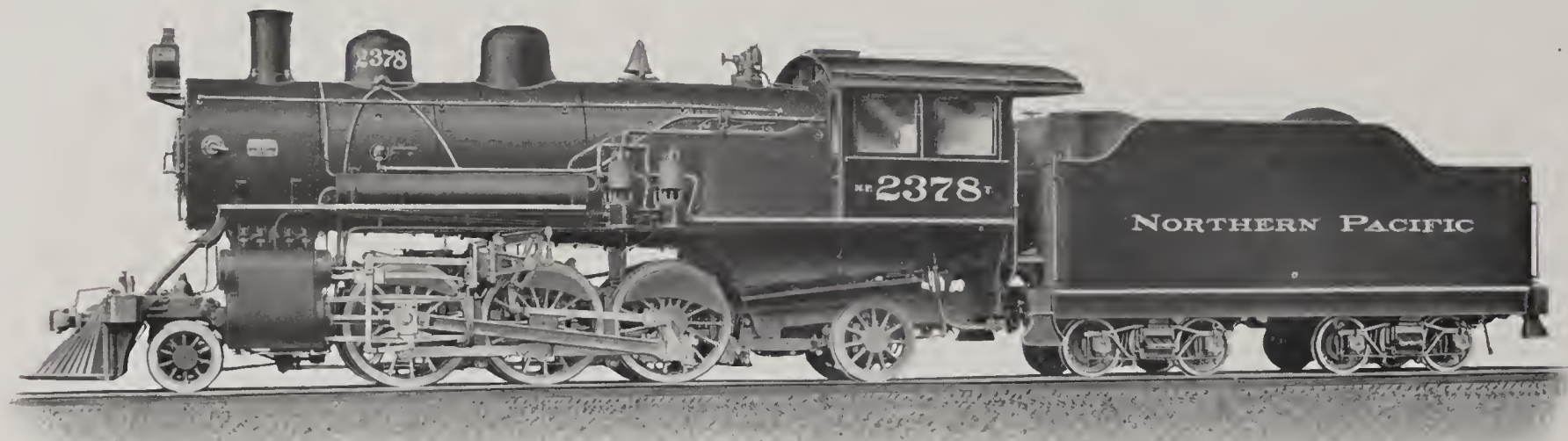


FIG. 21

parting any motion to the valve. It may be noted that the link position may be observed by the usual tram marks on the valve stem; or directly by marks on the link pin, as may be found most convenient, with the link block in full gear, preferably ahead.

4. The tram marks of the opening moments at both ends of the valve should be marked on the valve stem, and the latter lengthened or shortened until equal leads at both ends are obtained.

5. Within certain limits this lengthening or shorten-

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ing may be made on the radius bar, if it should prove more convenient; but it is desirable that the length of this bar should be so nearly equal to the radius of the link that no apparent change in the lead should occur in moving the link block, as stated in note No. 2.

the irregularities inherent in transforming rotary into lineal motions.

It may be of interest, before we end our study of the Walschaert valve gear, to consider some of the different arrangements employed in the application of it to



FIG. 22

6. The lead may be increased by reducing the lap and the cut-off points will then be slightly advanced. Increasing the lap produces the opposite effect on the cut-off and reduces the lead the same amount. With good judgment these quantities may be varied to offset

engines of different types and designs.

Figure 20 represents the arrangement of the gear as applied to a Pacific type engine built for the New York Central Lines. This engine weighs, in working order, 266,000 pounds, and with one exception—an engine of

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the same type built for the Pennsylvania—is the heaviest passenger engine ever built. Engines of this design are at present hauling the 20th Century Limited, the eighteen hour train between New York and Chicago.

Figure 21 shows the arrangement employed in the ap-

In figure 23, is shown a Mallet articulated compound engine built for the Baltimore & Ohio Railroad in 1904. This was the first engine of this type in America, and at that time was the heaviest locomotive in the world. It was also the leader of the introduction of the Walschaert

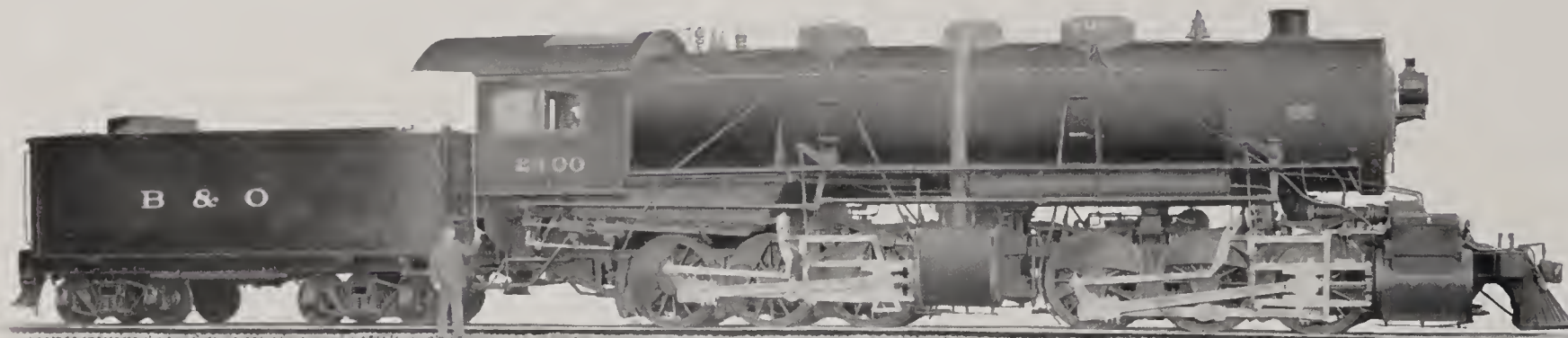


FIG. 23

plication of this gear to a Prairie type engine, built for the Northern Pacific Railway.

Figure 22 shows the arrangement employed in the application of the Walschaert valve gear to a deGlehn 4-cylinder, balanced compound Pacific type engine for the Paris-Orleans Railway.

valve gear into regular American railway service.

Figure 24 shows the engine which at the present time holds the record as being the heaviest and most powerful locomotive in the world. This engine has a total weight of 410,000 pounds and will haul a train of 2,600 tons on a 1.3 per cent. grade. It is one of three of the articu-

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lated compound type built for the Erie Railroad which are now operating in pushing service on the Susquehanna Hill, between Susquehanna and Gulf Summit.

These illustrations serve to show that the Walschaert valve gear may be applied to any type of engine with-

lead at all cut-offs; while, with the usual construction of the latter, the lead increases as the reverse lever is hooked up. The accessibility of the Walschaert valve gear is an undisputed point of advantage, which recommends it to all railroad men; and the fact that the Walschaert

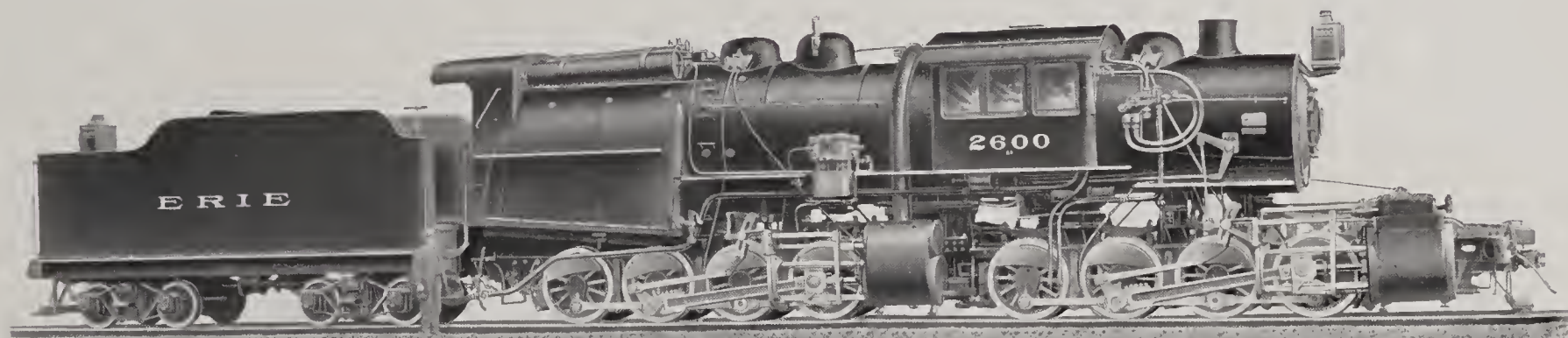
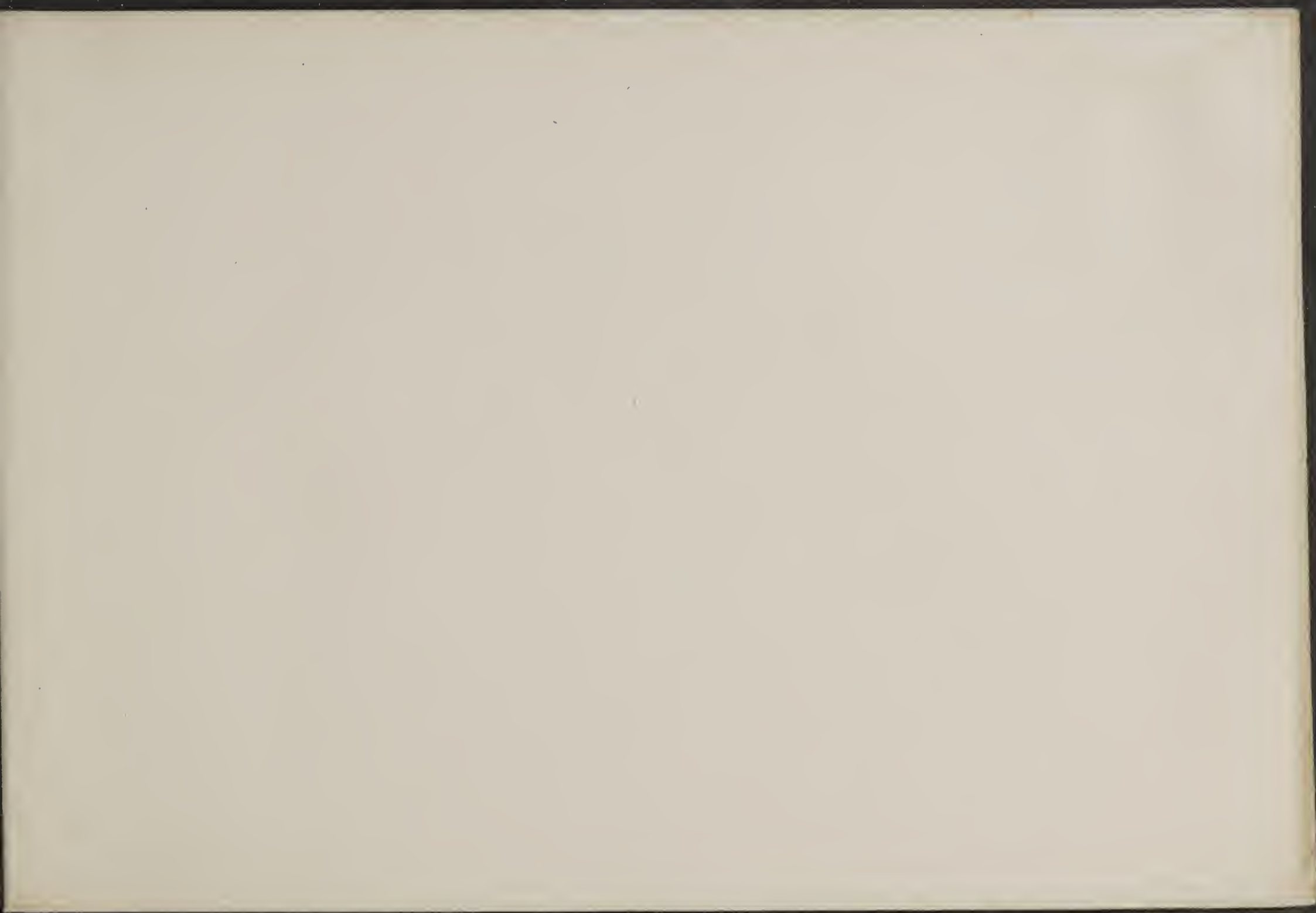


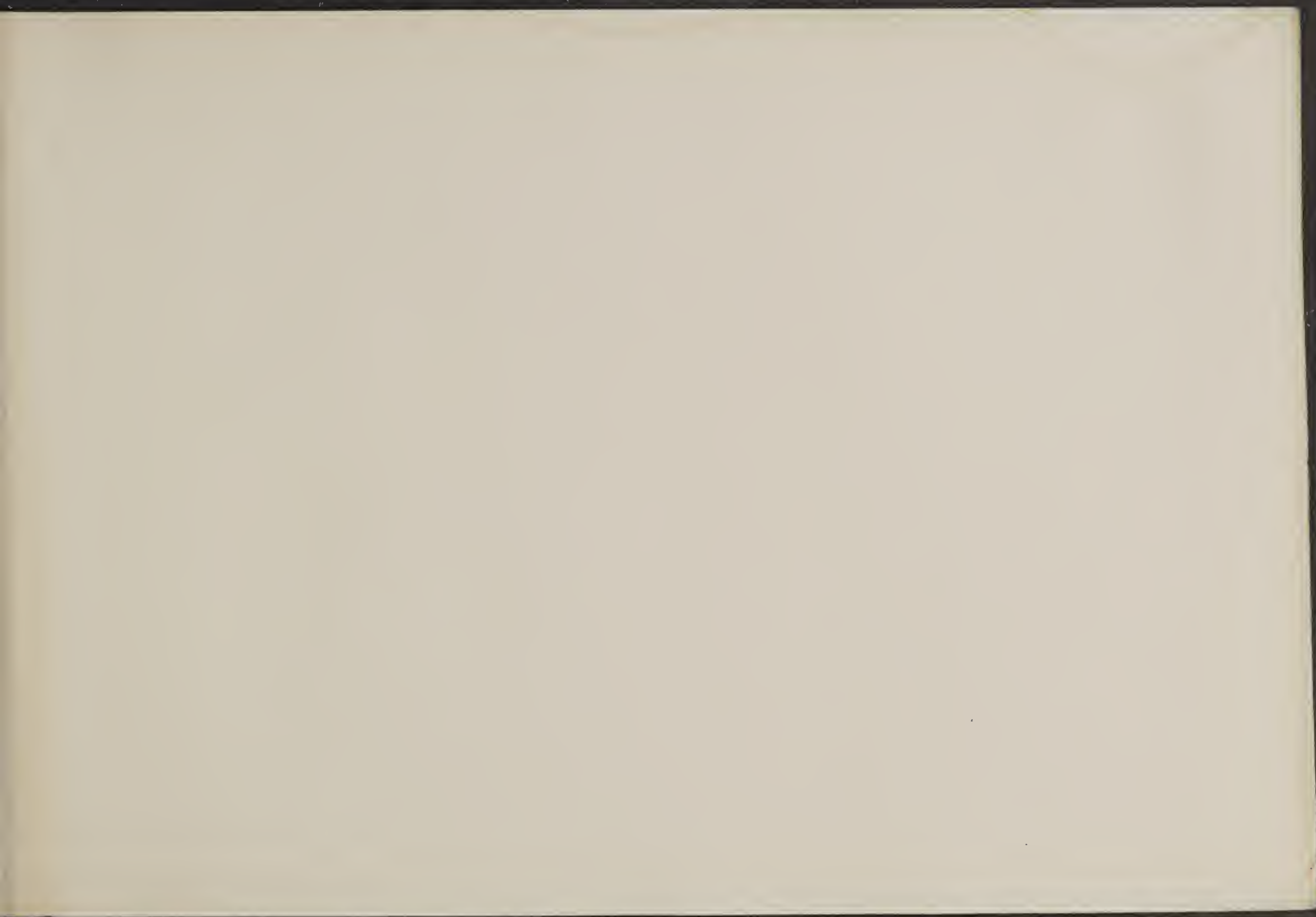
FIG. 24

out any material change in the design or multiplication of the moving parts, and this adaptability is one point in its favor over the Stephenson link motion. The essential difference between the Walschaert and the Stephenson types of valve motion is that the former gives the same

valve gear is increasing in favor with those roads that already have engines equipped with it, and that other roads show a willingness to try it out, would indicate that this valve gear will soon be more generally used in this country than the Stephenson link motion.

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